THE RELATIONSHIPS OF MESOLITHIC AND NEOLITHIC ECONOMIES IN NORTHWESTERN EUROPE

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C O N T E N T S

LIST OF ILLUSTRATIONS

I N T R O D U C T I O N

Following the milennia during which man relied solely upon hunting and collecting food resources provided by his environment, the agricultural revolution effected changes even more profound than those wrought by the Industrial Revolution of the past two centuries. Hunting and gathering economies did not allow the freedom from ecological restrictions offered by food production. In most cases social organization was based on small and relatively unsettled groups. Any such band permanently living and working together probably would have been no larger than the nuclear or extended family, in which the division of labor did not extend beyond the sexes. At least seasonal migrations would have been necessary in order to ensure a sufficient supply of food. The introduction of agricultural techniques in the Near East meant a great deal more than just controlled food production, for the resultant social stability and agricultural surpluses led to urbanization, social stratification, industrial specialization, and large-scale commerce.

Once established in the Mediterranean, farming populations advanced slowly into Europe. First the Balkans changed to a Neolithic economy, and from there Central Europe was colonized by farmers practicing shifting agriculture. By sea, other groups

entered southern and western Europe, and, last of all, the Scandinavian North was settled. In comparison with the Eastern Mediterranean, all these Continental Neolithic societies were impoverished, and Mesolithic tribes continued to flourish side by side with the new settlers, except when and where competition for land became too intense.

In many instances, the contact between Mesolithic and Neolithic groups is illustrated by the archaeological record, although this is at best only a fragmentary view of the total cultural content. In spite of the fact that the indigenous hunters and gatherers eventually were acculturated to a Neolithic economy, some of their equipment was in turn taken over by the agriculturalists or retained by the newly converted hunters. In Central and Western Europe, the Neolithic colonization seems either to have overrun and submerged the old inhabitants rapidly or to have ignored them for the time being, for the first Neolithic cultures had relatively little Mesolithic content. Some of the succeeding cultures, however, had more Mesolithic traits than the earliest ones. In the Southern Baltic region, there was more a blending of the two traditions, for the Mesolithic influences appear to have been greatest initially and thereafter steadily decline. Further north, Mesolithic traditions continued to dominate, largely because of ecological factors.

Professor Piggott (1954b) has shown how in Britain the Western, or "Primary," Neolithic cultures were complemented by certain cultures which he calls "Secondary Neolithic." These last were at least partly later in time and had in their cultural makeup many features reminiscent of the Mesolithic. This Mesolithic aspect in the British Secondary

Neolithic, which is also present in certain Continental groups, has often resulted in these cultures being considered chronologically early; however, it is now clear that these represent acculturated Mesolithic populations which entered the scene after the first period of Neolithic colonization when contact between the two economies was relatively insignificant. In a sense there was then a "re-florescence" of Mesolithic tradition in the later, mixed economies which retained a considerable number of traits from the local pre-Neolithic background.

Although the Secondary Neolithic cultures are anything but homogeneous, there are a number of elements uniting them. The pottery has in common a clear deterioration of earlier Neolithic ceramic techniques. Flint-mining, although not unique in the Secondary Neolithic, is characteristic, and typically associated with the mining activities are "Campignian" picks and tranchet axes. A smaller flint type of Mesolithic ancestry is the transverse arrowhead and its derivatives. A number of other stone types as well as bone and antler artifacts can be traced back to Mesolithic sources. An increase in hunting activities usually is indicated by the implements and/or faunal remains. The extent of Mesolithic influence naturally varies from culture to culture.

This phenomenon, if it is to be accepted as a theory valid for general application, should appear likewise on the Continent where Mesolithic and Neolithic cultures came into contact. That such mixed economies do occur, although the patterns are not so clear, is what this paper attempts to illustrate. The problem is complicated by the lack

of information regarding the Mesolithic background of most areas outside Britain and Scandinavia. It must be admitted that in certain regions most of our information regarding the Mesolithic period comes from the non-Neolithic content of Neolithic cultures. Another factor to be considered is the variation in quantity and quality of archaeological investigation in different countries.

The areas from which the cultural material described here is derived include the Baltic, France and the Low Countries, Switzerland, and Central Europe. Since Professor Piggott has covered the British Neolithic more than adequately, the British Isles are dealt with only briefly. Part III contains a brief summary of North American prehistory for the purpose of showing the basic cultural unity in the Northern Forest Zone and independent cultural parallels which may aid in the interpretation of European prehistory.

The absolute dates given for the Mesolithic and Neolithic subdivisions in Europe not only vary a great deal but are sometimes misleading. Presumably we shall soon have a foundation of published radiocarbon dates upon which to build a chronological framework and to judge the purely archaeological dates. Until this time, it seems unwarranted to place too much emphasis on dates now at our disposal. Consequently, the greater share of attention is given relative chronologies, although radiocarbon data will be included where available.

PART I

M E S O L I T H I C

CHAPTER I

AZILIAN

The initial Mesolithic cultures of Western Europe are not only poorly defined but appear degenerate in contrast to the preceding Magdalenian. The reason for the deterioration of Upper Palaeolithic industries in bone and antler and the disappearance of naturalistic art remains a mystery; nor can we be certain these earliest Mesolithic manifestations represent local retrogressions in material culture or intrusive traditions.

The Azilian type station at Mas d'Azil, Ariège, is illustrative of a typical assemblage, in this case recovered from hearths in a reddish clay. Stag and wild boar predominated among the faunal remains, and although early reports assigned cultivated plants to this occupational level, there are no indications of a Neolithic economy.

The larger stone tools at Mas d'Azil included flakes, flake scrapers, keeled scrapers, and burins. In addition to these were some very small tools: tiny burins, small flakes, discoidal scrapers, and geometric microliths (triangular or crescentic but rarely trapezoidal). The excellent Magdalenian bone and antler work had disappeared, and all the Azilian deposit offered was a few bone awls, polishers, and the typical broad, flat harpoons of deer antler (Fig. 2: f). The typology and distribution of Azilian harpoons is discussed in detail by Thompson (1955).

Perforated animal teeth and shells were worn as ornaments, and large numbers of painted pebbles were recovered in the cave. Obermaier (1924, 341-2) has suggested a relationship between the pebbles and conventionalized Spanish rock paintings, and believes that both had some supernatural significance, possibly related to some sort of ancestor cult.

Imbedded in the Azilian deposit were two human skeletons. Since the small bones are missing it has been assumed that before burial the bodies were exposed and scraped and the bones painted with ochre.

In northern Spain the Azilian is limited to the north coastal area (Cantábrica), where it occurs in nearly every cave which contains a thick Magdalenian deposit (Almagro, 1947, 403-8). The work in bone and flint is much the same as in France, but no painted pebbles appear in Spanish Azilian, probably as a result of climatic conditions.

Azilian distribution outside the Franco-Cantábrican area is not well documented. Of most significance are a number of cave sites in southern Germany, some of which have yielded organic remains in considerable amounts. The best known of these are Falksteinhöhle and Bernaufels near Tiergarten in Hohenzollern, Probstfels near Beuron, and Teufelsloch near Gutenstein (Peters, 1934). Polished antler sleeves (one containing an axe), an "elbow-bone" dagger made on a fox ulna, "bone-polishers" of boar's tusk and deer antler, and a polished and pointed object of boar's tusk were among the more important objects. Ornaments were of shell and the teeth of fish, deer, and fox.

The famous skull deposits in Ofnet Cave, near Nördlingen, in Bavaria, are commonly attributed to Azilian (Schwantes, 1952, 11).

The two pits contained six and 27 skulls, respectively. All were sprinkled with red ochre, and pieces of charred bone interred with the crania suggest the trunks were cremated. Very little material accompanied the burials; in addition to some snail shells and deer teeth, there were a few indeterminate flint blades and a single triangular microlith of Tardenoisian type (Breuil, 1909, 210). Breuil defines the assemblage as "Azilio-Tardenoisian"; others think it Azilian. The sparsity of cultural traits in the deposits makes it impossible to assign Ofnet to any particular Mesolithic tradition.

The Falkenstein material includes elements, notably the antler sleeves, which suggest affinities with Northern Forest cultures. In summarizing the south German sites, Peters points to northwest Britain for analogies, but the "Azilian" component in Scottish sites is now acknowledged by most authorities to be of Baltic, not of southwest European, origin.

CHAPTER II

TARDENOISIAN

The origins of Tardenoisian lie in the Mediterranean area. The question is whether it arose from the local Upper Palaeolithic of south-west Europe or resulted from the immigration of North African Capsian or represents a mixture of both. This problem has been discussed for years without being solved, and the facts seem to lend some credence to each. As Smith (1952, 119) has suggested, we might better speak of a "community of tradition" around the Mediterranean for the present.

The most widespread of any Mesolithic group, these people occupied an area extending from the Mediterranean to the southern shores of the Baltic and from the British Isles to the Soviet Union. Settlements are found largely on sandy soils, although some sites are known on elevated rock-outcrops, lake shores, and sea coasts. The majority of these appear to represent only the most temporary sort of occupations with no indication of the type of dwellings used. In some instances, however, Tardenoisian remains have been associated with caves, rock-shelters, or semi-subterranean huts (Clark, 1936, 195-200). Both forested land and loess seem to have been avoided, and the industry appears to contain few heavy implements for coping with the forest.

Due to the very nature of the sites, artifacts other than those of stone are rarely obtained, imposing a severe limitation on our

perspective of Tardenoisian technology. Another result is the rarity of stratigraphically-supported chronologies for given regions. In any case, the means of dating by the succession of postglacial climatic events, so profitably employed in Northern Europe, are lacking in the greater part of the Tardenoisian habitat. For these reasons, relative dating is too often restricted to typological sequences and association with other, primarily Neolithic, cultures.

From the "classic" area of Tardenois in France (Daniel, 1948, 447) to Poland (Kozlowski, 1926, 56) it is certain that much of the Tardenoisian span falls within the Neolithic period. In the Tardenois area itself only Sauveterrian appears to be pre-Neolithic, and Tardenoisian in some areas at least overlaps the Chalcolithic (Barrière, 1955, 205-6; Bailloud and Boofzheim, 1955, 10-12). Contemporaneity with the Neolithic can be demonstrated by the presence of Neolithic pottery and flint types and occasionally domestic fauna on Tardenoisian sites (Mazalek, 1954; Clark, 1956, 16). Since the Tardenoisians occupied land that was relatively undesirable, it is unlikely that there was much conflict with farmers at first. This is supported by the almost complete absence of weapons among the earliest Danubian colonists (Childe, 1950, 100) and the mutually exclusive distribution of settlement.

Typical of Tardenoisian are microliths and the by-product of their manufacture, the microburin. Earlier, non-geometric microliths blunted obliquely or on one edge were succeeded by triangular, crescentic, rhombic, or trapezoidal forms associated with hollow-based points and pointed flakes which still retain the bulb of percussion. Scrapers are

usually plentiful, and burins are commonly present though not in large numbers on any one site. While some of the microliths were hafted singly, it is virtually certain that many were destined for use in composite implements.

Although a number of classifications of Tardenoisian have been proposed, investigators in France generally recognize a "pre-Tardenoisian" or Sauveterrian, a "typical" Tardenoisian, and an evolved (Neolithic) Tardenoisian. In some cases, the post-Sauveterrian material is divided into Tardenoisian I - III.

Sauveterre-la-Lémance (Lot-et-Garonne) provided the basis for the creation of "Sauveterrian" (Coulonges, 1935). Sauveterre is a stratified site containing Magdalenian, Sauveterrian, and Tardenoisian I - III. The Sauveterrian level is characterized by microlithic triangles and Tardenoisian I by irregular trapezoids and rhombic forms. Tardenoisian II has more evolved types, and trapezes are well defined. Tardenoisian III has tanged and barbed points, petit tranchets, oblique points, and pottery, all in association with preceding types.

The Sauveterre sequence is supported by the Cuzoul rock-shelter near Gramat (Lacam, Niederlender, and Vallois, 1944), where the levels are as follows: Sauveterrian, Tardenoisian I (2), Tardenoisian II (2), Tardenoisian III, and Neolithic (evolved Tardenoisian III). A gradual and uninterrupted evolution may be detected in the flint types of the first five strata. This continues in the last two but with the addition of Neolithic forms. The flint inventory is supplemented by a number of bone and antler artifacts: perforated deer teeth, bone awls, bone

gorges, perforated bone and antler fragments, awls and scrapers of boar's tusk, and one antler axe. Worked boar's tusk was also found in the Sauveterrian and Tardenoisian I - II levels at Sauveterre (Coulonges, 1935, 23).

Flint types characteristic of French Tardenoisian in general are microburins, burins, blades, notched blades, triangular blades, cores, "Tardenoisian points" (blades with one oblique, retouched end), awls or borers, scrapers (discoidal, blade, core), and trapezes and triangles. In later Tardenoisian were added barbed points, petit tranchets, leaf-shaped points, and axes, most of which may be traced to Neolithic influences.

The use of "Sauveterrian" implies a derivation of Tardenoisian from the French Palaeolithic or Azilian, for it appears to include types common to both the Palaeolithic and Mesolithic. Coulonges describes Sauveterrian as the "last gasp" of the French Palaeolithic; others (Giraud and Vignard, 1946) prefer to draw analogies with North African Capsian and deny contact with the Palaeolithic. Although Sauveterrian may have had African affinities, it is difficult to explain it wholly as a migration from North Africa (Smith, 1952, 120). However, it is not within the scope of this paper to carry the matter further.

Another stratified site is Piscop in Seine-et-Oise (Giraud, Vaché, and Vignard, 1938), which was discovered by Giraud in 1930 and is located on the eastern promontory of the Montmorency plateau near the village of Piscop. Neolithic, Tardenoisian, and Upper Palaeolithic were superimposed upon one another, and in the Mesolithic stratum the remains

of both hearths and hut foundations were uncovered. There were also two pits, each containing some microliths and a truncated blade similar to those interred with skeletons at Téviec (Péquart, Boule, and Vallois, 1937). It has been suggested that these were graves from which the bone had long since disappeared.

Flint artifacts (Fig. 1: b) included flakes and blades without retouch, cores, pics-planes, scrapers, truncated blades with oblique retouch, burins, microburins, "Tardenoisian points," crescents, triangles, and trapezes. A distinctive feature of Piscop was an industry in stone (grès lustré), consisting of picks with quadrilateral or triangular cross-section (Fig. 1: a); a few microliths and Tardenoisian points of much the same composition as the flint ones; cores, scrapers, blades, and burins. There were indications that Piscop was a factory workshop, or series of them, as well as a habitation site. The authors discern two Mesolithic occupations, one contemporary with Sauveterrian and the other with true Tardenoisian. The addition of a heavy element may have something to do with the fact that the site was occupied over a fairly long period. If it were not that most Tardenoisian sites appear to be only the remains of temporary encampments, more heavy tools might be ascribed to the culture. Because of the heavy element, Nougier (1950, 175) assigns Piscop to his Campignian "forest" facies.

Two workshops at the "Désert d'Auffargis" in Seine-et-Oise (Robert and Vignard, 1945) also have industries in flint and Montmorency sandstone with much the same inventory of types. These, however,

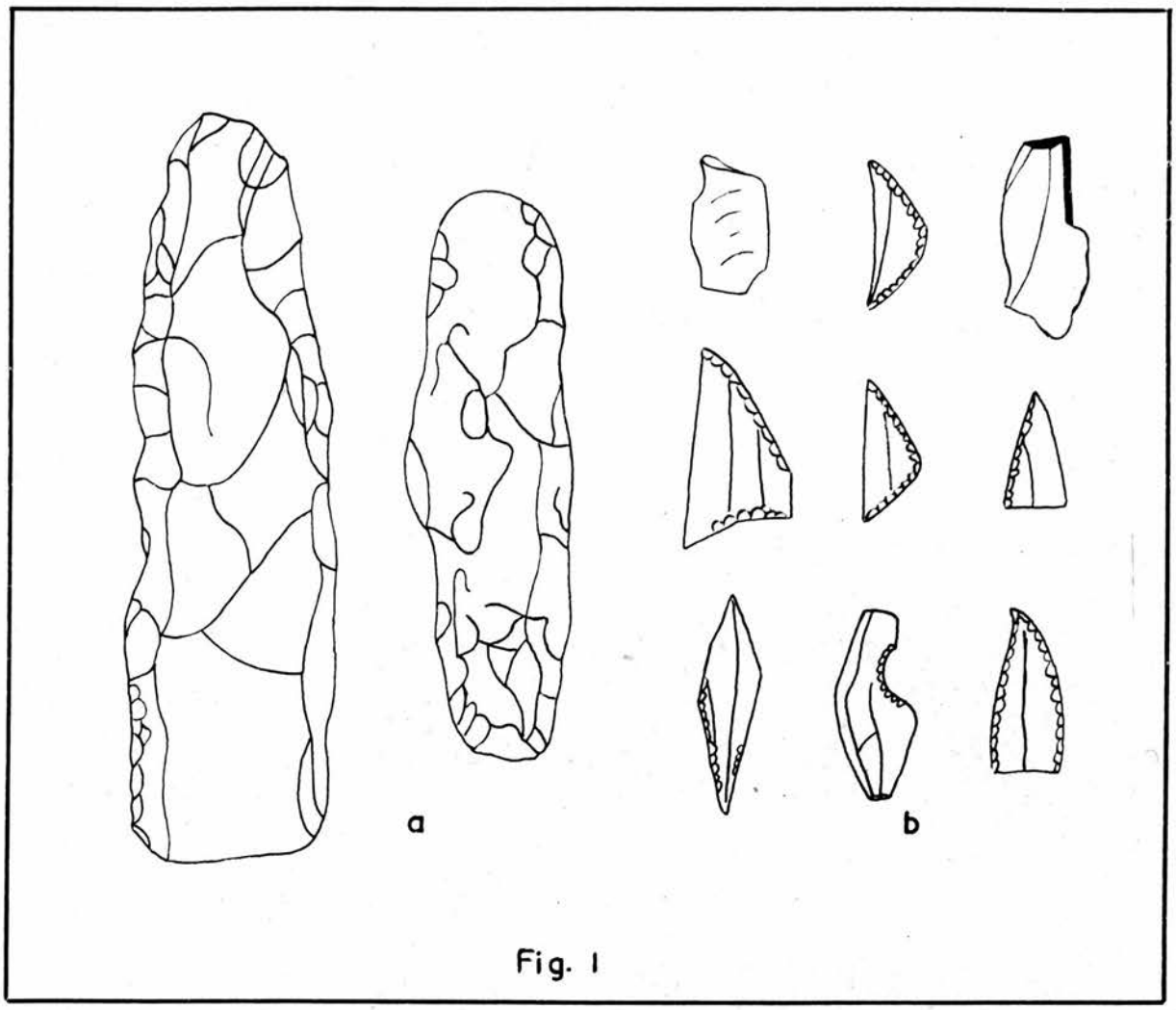


Fig. 1

Tardenoisian industry from Piscop, Seine-et-Oise.
(After Giraud, Vaché, and Vignard, 1938)

seem to be of a more temporary nature, since there were no signs of dwellings or hearths.

Within the Tardenoisian family there was also a coastal group of strand-loopers living on shell middens on the islands of Téviec and Hoëdic off the Breton coast. These islands were, at the time of the Tardenoisian occupation, a part of the mainland, and it is therefore probable that other sites were inundated.

Téviec (Péquart, Boule, and Vallois, 1937) lies immediately off the Quiberon Peninsula. The primary features within the midden were a number of pits and rock-built tombs. The tombs were constructed by means of piling a protective wall of boulders around the body and covering the grave with a stone slab, upon which a ritual hearth was placed. The last phase of construction involved heaping stones over the ritual hearth, in which there were found offerings of deer or pig mandibles. These tombs contained from one to six bodies either "squatting" or extended dorsally with the head and shoulders slightly elevated. The legs were in forced flexion and the hands usually placed over the front of the body. Those adults buried with an infant were always in the seated position. At least some of the dead were interred wearing a sort of antler headdress (Péquart, 1929, 399), and all were covered with red ochre.

In addition to shell necklaces and bracelets, the graves ordinarily contained bone "stilettos" and truncated, retouched blades. The Téviec people seem to have been particularly concerned with such blades, which were habitually larger and better made than those found

in the midden itself. The rest of the grave goods varied with the individual concerned. There were perforated teeth, bone awls, microliths, bone points, perforated patellas, schist pebbles, and so on.

Besides the ritual hearths associated with the graves there were a number of domestic hearths full of cooking debris. Some of these were so well laid out that considerable care must have been taken in building them.

The midden itself was not especially informative. Large numbers of microlithic flints were scattered about. Rather irregular triangles were used as arrowheads (one was found imbedded in a vertebra of a skeleton). Trapezes were also irregular in size and form, and micro-burins and burins appeared only rarely. Fine workmanship is shown on some almond-shaped points retouched on only one side. Triangular blades also functioned as projectile points. Notched blades, awls, truncated blades, scrapers, and worked or utilized pebble tools were common. Bone artifacts, in addition to the daggers, included awls, polishers, gorges, a roe-deer <u>bâton de commandement</u> (?), and perforated teeth. As at Sauveterre and Cuzoul, boar's tusk was a frequent raw material. Any sort of art was practically absent, although there was one small amulet of bone with checkerboard cross-hatching (typical of Maglemose), an engraved fish mandible, and three bone stilettos with series of short, parallel lines incised upon them.

The Téviec people lived mostly on seafood, especially shellfish, although land mammals were represented. With the fish bones and marine

shells were the remains of pig, red deer, roe-deer, beaver, hedgehog, marten, wildcat, dog, fox, and seal; and about twenty species of birds were identified from the midden. No domestic animals were identified, with the exception of one sheep or goat molar.

Téviec is most frequently assigned to early Tardenoisian (Barrière, 1955, 205; Coulonges, 1935, 53), since Neolithic traits appear to have been entirely absent. The contemporaneity of the burials and the midden is supported by the complete correspondence of artifacts. Except for the absence of axes on the one hand and the preoccupation with burial ritual on the other, one cannot help but be struck by the general similarity between these Mesolithic maritime inhabitants and those of the Baltic.

Hoëdic (Péquart, 1954) is in the same chain of islands as Téviec but at the southeastern extremity. Without any doubt the site was occupied by a group closely related to that on Téviec. The flint industry is exactly the same, although bone utensils are represented only by badly preserved and virtually unidentifiable pieces. In the Hoëdic midden the graves were not stone-built. There were nine graves with thirteen burials, all of which were oriented north-south with the heads placed to the north. In spite of the differences in grave construction the picture is much the same as at Téviec. The heads and shoulders of the bodies were elevated, ochre was used, and grave goods were of the same nature. Again, there appeared to have been no more than one occupation.

It seems relevant at this point to mention some analogous Iberian coastal sites. In the Tagus River valley of Portugal are a

number of huge shell heaps (Mendes-Correa, 1934; Obermaier, 1924). The marine shells making up the middens were gathered at a time when the sea level was much higher than now. Remains of wild land mammals (wild cattle, deer, horse, swine, dog or wolf, felines, badger, civet, and hare) are present, but not domestic animals. Pottery and polished stone are likewise absent.

Scattered about in the middens are numbers of bone and stone implements, including geometric microliths and blunted blades. The microliths consist of crescents, triangles, trapezes, and micro-burins. The bonework is non-distinctive, if not indeterminate. Ribeiro (1880, Pl. III and IV) illustrates some pieces of worked antler, bone spatulas, bone "awls" (plain bone points?), and also a number of unmistakable transverse arrowheads. The Tagus middens are assigned to the Capsian by most of the Spanish and Portuguese archaeologists, but Obermaier (1924, 326) has stated: "This final Capsian phase is in all essential points identical with the Tardenoisian of France."

Near the base of the shell heaps have been found many human skeletons of different age and sex. The bodies were in squatting or extended positions (as at Téviec), and there are few indications of burial ritual and no grave goods (Ribeiro, 1880, 286; Herve, 1899, 266).

Similar sites have been recognized on the Sado River in southern Portugal (Almagro, 1947, 419). There is still little information on the stratigraphy and typological evolution of material in the Portuguese shell mounds.

In the Cantábrican area is the Asturian culture, which appears in caves and rock shelters along the coast. The deposits consist of shell mounds in and around the habitations. In the middens occur the bones of deer, horse, cattle, boar, ibex, chamois, weasel, otter, wolf, wildcat, badger, and hare. No human remains have been recovered thus far. Cultural material is found in layers of ashes, charcoal, and ochre. Implements—coarse scrapers and cleavers, nondescript flakes, and "Asturian picks"—are made of quartzite. The Asturian pick is simply a pebble with a few large flakes taken off one end. The bone industry is rudimentary and poorly preserved. Pieces of antler with oblong perforations and bone punches for getting the meat out of shellfish are the two most common types.

Although largely later than Azilian, in some sites Asturian stonework is mixed with the final stage of Azilian. Pottery in the late phase indicates that the Asturian extended into the Neolithic.

These Iberian middens illustrate the fact that Téviec and Hoëdic were not isolated phenomena during the Mesolithic. In fact, the Tagus shell mounds have a number of features (burials, combined economy of hunting and shellfish collecting, blade and microlithic industry) in common with Téviec. Stone-built tombs are lacking in the Tagus mounds, but they are absent at Hoëdic also. The Asturian industry is much too poor for comparison, but pebble tools and a "<u>bâton de commandement</u>" were found at Téviec. In a broader sense, it is clear that there was a Mesolithic "midden complex" extending along the Atlantic coast from Scandinavia and Scotland down to southwestern Iberia.

In Switzerland the expansion of the moors during the period of forestation must have been an important factor in the Mesolithic settlement pattern (Vogt, 1952, 155), for the fowling and fishing opportunities would have lured Mesolithic hunters. These potentialities may have led to a more sedentary way of life, anticipating the lacustrian occupation characteristic of the Neolithic. However, Swiss Mesolithic sites as a whole are not very enlightening, most of them being surface deposits of microlithic flints (Sauter, 1948, 184-5). Although a harpoon and a colored pebble were discovered at the site of Wachtfelsen near Grellingen and assigned to the Azilian, most of these assemblages appear to be Tardenoisian. In Kt. Soleure, a rock-shelter called Unter der Fluh and an open station, Studenweid-Düniken, were found to contain numbers of Tardenoisian microliths, and in Bern and Zurich, Tardenoisian sometimes occurs in mixed Neolithic sites. More than fifty Mesolithic sites are known from the Constance region on Bodensee (Beck, 1939), but this material also is mixed with Neolithic types.

The stratified site of Birsmatten-Basishöhle at Nenzlingen, Kt. Bern (Bandi and Lüdin, 1955; Bandi, 1956) illustrates clearly the presence of both Sauveterrian and Tardenoisian. Superimposed upon a Sauveterrian level, the Tardenoisian implements (Fig. 2: c-e) include small blades (some of them notched), scrapers, petit tranchets and derivatives, antler hide-scrapers (?), bone awls, and worked boar's tusk. Perhaps most important is a series of fragmentary antler harpoons, one of which appears to have been perforated at the base. The striking thing about them is that they are broad, flat types much like Azilian and Swiss Neolithic barbed points.

From the Sauveterrian stratum is a different industry (Fig. 2: a), also based on blades. The leading type is an asymmetrical triangular point, which was associated with a few crescentic microliths (no trapezes), microburins, burins, crude scrapers, antler "hide-scrapers," bone awls, worked boar's tusk (Fig. 2: b), and ochre. Interred in the Sauveterrian level was a dorsally extended skeleton in an excellent state of preservation but without grave goods. Below this was still another cultural stratum, but water action has made it impossible to analyze. The artifacts are larger and cruder and may represent a mixture of different levels.

Animal bones abounded and are still in the process of being identified. Wild pig and deer seem to have been predominant throughout, and fish bones were plentiful in the Tardenoisian horizon. Bandi suggests an early Postglacial date for the site, although no radiocarbon or pollen dating has yet been undertaken.

Vogt (1952) found a barbed point in the Schötz museum (Luzern) whose closest affinities seem to be with Maglemose examples. This type, unlike the Azilian, Birsmatten, and Swiss Neolithic points, is made of bone and has one small barb on each side. Analysis of pollen contained in the exposed spongy bone at the butt supports a Mesolithic date.

Fig. 2. Sauveterrian and Tardenoisian tools from Birsmatten-Basishöhle, Kt. Bern, Switzerland.

a: flint tools (Sauveterrian)
b: boar's tusk implement (Sauveterrian)
c: transverse arrowheads (Tardenoisian)
d: barbed antler points (Tardenoisian)
e: scraper and blade (Tardenoisian)
f: Azilian harpoons

(After Bandi and Lüdin, 1955; Bandi, 1956; Obermaier, 1924.)

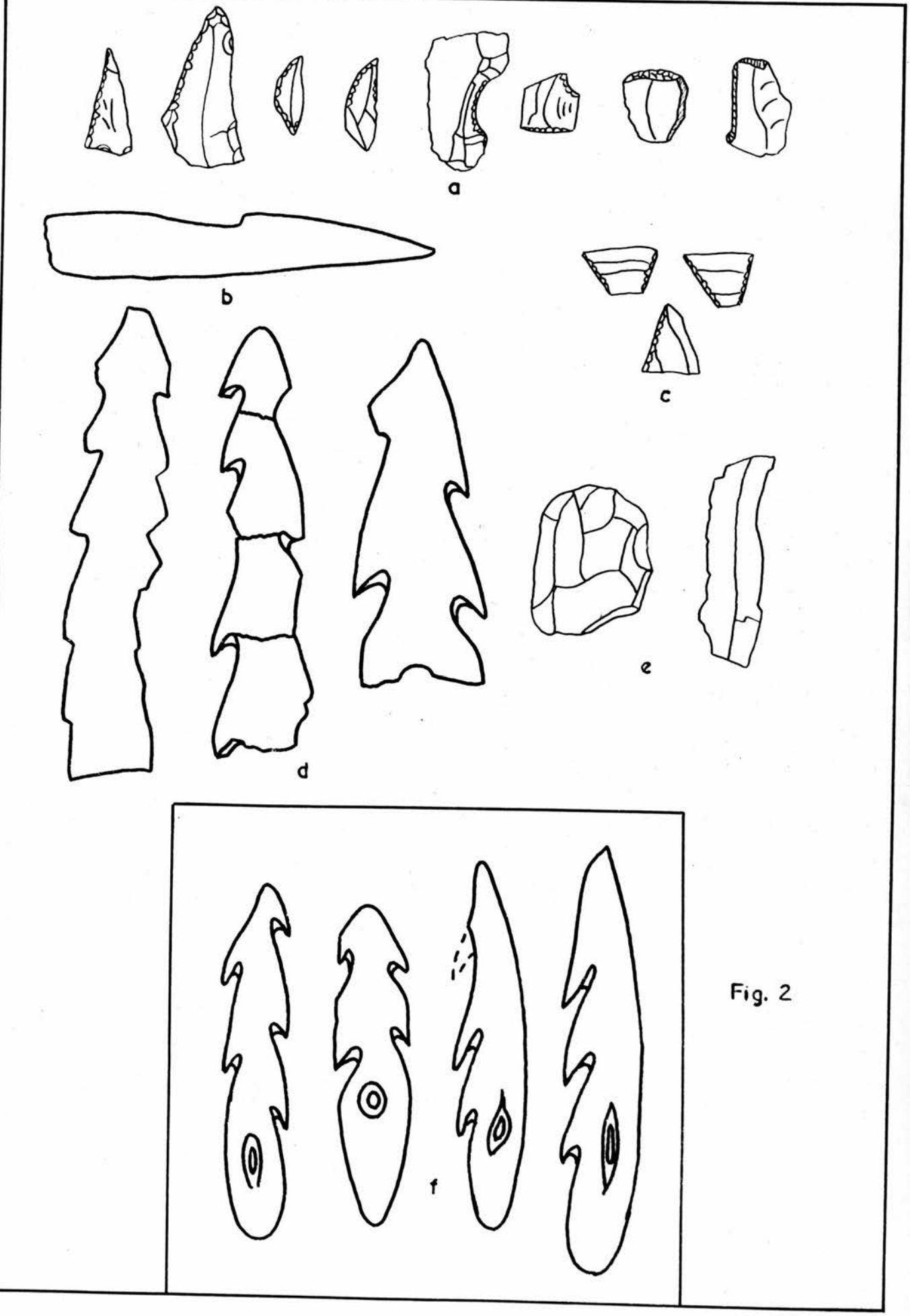


Fig. 2

The Mesolithic sites of southwestern Germany described by Peters (1934) contain Birsmatten-type antler harpoons, on the basis of which the complex was assigned to Azilian. The indeterminate nature of the flint types, the occurrence of polished antler sleeves, and the duplication of the antler points in Switzerland suggest a re-evaluation of this material would be in order.

Ensdorf, Bavaria, has produced a reasonable amount of worked bone: the tips of a couple of pointed objects, a fragment with signs of sawing, three bowed, pointed pieces made on small ribs, another fragment with incised lines, and bird bones broken off at the ends. In one of the latter a microlith was hafted.

It is from the Federsee moor in Württemberg (Reinerth, 1929) that we have the best evidence for branch-woven or wattle-and-daub huts. At the Mesolithic level were found oval hut-foundations, containing hearths and traces of tree-branch frameworks. These appear to have been characteristic of only late Tardenoisian (Clark, 1936, 200). With the exception of one plain bone point, all the material from Federsee was inorganic.

Clark also mentions the occurrence of other semi-subterranean huts in England, Belgium, and Germany. These parallel pit-foundations in France already discussed (p. 12). At Ražice in southern (Mazalek, 1951, -52, -53) and Tašovice in western Bohemia (Prošek, 1951), Sauveterrian or early Tardenoisian material has been discovered in association with such pits, at least some of which represent dwelling foundations.

Ražice appears to have been a fairly permanent site with workshops and dwellings. Some of the pits contained hearths and postholes; some disclosed stone anvils used in the production of quartzite tools. The duration and popularity of the site are reflected by the large number of pits and suggestions of an earlier, Magdalenian occupation.

The Tašovice material consists of two communicating pits with traces of a hearth between. Prožek assigns the associated stone industry to Sauveterrian, which is common elsewhere in the region.

In Westphalia, Tardenoisian flint types have been found at a number of locations in the Teutoburger Forest, and near Oerlinghausen in association with a circular hut foundation outlined by postholes (Diekmann, 1939). The tool series was characteristic of late Tardenoisian, except for the appearance of a core axe with a ground edge.

With the exception of the loess areas and the Baltic coast, Tardenoisian is known all over Poland. Much of the culture was contemporary with the Neolithic. Since most of the material has come from dunes, only the lithic element has been preserved. One may note that in these sites, Tardenoisian is often mixed with a "Campignian" heavy industry (Kozlowski, 1926).

In Britain, the "Tardenoisian" industries have been re-classified as Sauveterrian by Clark (1956). As in French Sauveterrian, sites like Peacock's Farm in Cambridgeshire (Clark, Godwin, and Clifford, 1935) display a preponderance of elongated triangles and obliquely

blunted points as opposed to the trapezes typical of Tardenoisian. Armstrong (1925) tried to establish the origin of the British microlithic tradition in Cresvellian, largely on the basis of a mixed site at Mother Grundy's Parlour in the Pennine district. However, the possibility of a French origin can not be ruled out. British Sauveterrian industries occur from Cornwall to eastern Scotland but primarily in non-forested areas.

The so-called Horsham culture has a similar microlithic assemblage in addition to axes, adzes, and hollow-based microlithic points (Clark, 1936, 14).

Swiderian (also Chwalibogowician) was centered in the valleys of the Vistula and the Bug, extending west into Germany and southwest into the Ukraine. Since Swiderian is essentially the same as Ahrensburg and Remouchamps, Clark (1936, 62 ff.) includes it under his Tanged Point Cultures of Northern Europe.

Only the stone element has been preserved, for the Swiderians also settled in sand-dune areas. The stone work includes only flake and blade implements; there is no heavy industry. Swiderian is characterized by a very evolved blade technique, the results being similar to Solutrean work (Kozlowski, 1926). Blade scrapers and burins are distinguished from Ahrensburg by the absence of obliquely blunted, hollow-based points and some differences in flaking. As in Ahrensburg there are no microburins.

Most authors assume Swiderian was derived from some facies of Aurignacian, e.g. Predmost or Font Robert. At least in its early stage Swiderian antedates Polish Tardenoisian (Clark, 1936, 66).

CHAPTER III

IRISH MESOLITHIC

Toome

The Toome Culture at Lough Neagh, Co. Londonderry, is the earliest Irish Stone Age. An early Boreal manifestation (Jessen, 1949, 121), it is of Creswellian antecedents with no apparent Tardenoisian or Baltic increment (Lacaille, 1954, 124). Flint types are hammerstones, small picks, cores, steep scrapers, gravers, utilized blades, end scrapers, and perforators. Red-deer tibiae were worked into points.

Larnian

The primary occupation of Ireland is represented by Early and Late Larnian, referable to the Boreal and Atlantic periods respectively. Early Larnian is mostly a carry-over from the Upper Palaeolithic, but Late Larnian represents a change from forest-fenland hunting and gathering to a coastal economy (Ibid., 135). Early Larnian types include mostly flakes and blades, steeply-dressed blade implements, end scrapers, side scrapers, hollow scrapers, perforators or awls, core scrapers, "Larne picks" (typical of Late Larnian), and "Cushendun picks." In Late Larnian are thick and poor flakes and blades, crude tanged points, retouched scrapers, perforators, choppers, Larne picks, and sporadic flake axes and adzes. Bone work is rare and atypical, although it undoubtedly was important.

That southwest Scotland had relationships with the Larnian culture-area is shown by the "advanced Early Larnian" at Campbeltown and Albyn Distillery.

CHAPTER IV

NORTHERN FOREST CULTURES

A review of the natural history of Northern Europe is an essential preface to any consideration of the culture history of this area. From the archaeologist's standpoint the sequence of natural phenomena enables one to set up a cultural chronology, and it is precisely in this area that archaeological dating by means of geological and botanical methods has been most highly developed. Of late, the greatest emphasis has fallen upon the floral succession following the retreat of the glaciers. This succession is determined by the analysis of pollen deposited in different strata of peat. Since the nature of the vegetation at any given time depended to a large extent upon climatic conditions, we have a sequence of correlated pollen and climatic zones. While the climatic divisions are the same all over Northern Europe, the pollen zones given here will be those of Denmark. On the following page may be seen the zoning of England, North Germany, and the Scandinavian peninsula.

The Late Glacial period is subdivided by three pollen zones (I, II, and III). This period was characterized by subarctic climate with only a few stunted trees scattered over grassland and tundra. Zone I (Older Dryas) was followed by the Allerød oscillation of Zone II, during which there was a slight amelioration

Fig. 3. BALTIC LATE GLACIAL AND POSTGLACIAL CLIMATIC SEQUENCE

Pollen Zones	Climate	Sea	Vegetation	Eng-land	Swe.-Nor.	N. Germ.
IX	Sub-Atlantic	Baltic	Pine reversion Beech	VIII	XI	XI
VIII	Sub-Boreal	Litorina Transgressions 4	Spruce Oak Pine (Cultivation)	VII-VIII VIIb	X	X IX
VII b VII a	Atlantic	Litorina Transgressions 3, 2, 1	Mixed Oak and alder	VIIa	IX	VIII
VI	Boreal	Ancylus	Mixed oak begins Pine/hazel	VI	VIII	VII
V	Boreal	Ancylus	Pine/birch	V	VIII	VI
IV	Boreal	Yoldia	Birch	IV	VII	V
III	Younger Dryas	Baltic Ice Lake	Tundra	III	VI	IV
II	Alleröd	Baltic Ice Lake	Park tundra	II	V	III
I c I b I a	Older Dryas	Baltic Ice Lake	Tundra	I	I-IV	II I

of climate. This oscillation has been traced in Britain and even North America. Zone II is the only zone with a good C-14 date (roughly 11,000 years). The Mankato moraine in Wisconsin, which supposedly represents the same oscillation, yielded the same date (Crane, 1956, 669). It is hoped that dates for the other zones will soon be published.

Zone III (Younger Dryas) marks a reversion to the conditions of Zone I.

The tundra of Late Glacial times supported herds of reindeer, which in addition to deer, elk, bear, bison, horse, and hare, formed the basis of human economy during that period.

The Zone III - IV boundary represents the beginning of Postglacial forestation. Culturally, we may now speak of the Mesolithic period. The first Postglacial period, the Boreal, had a rather warm and dry Continental climate and is subdivided by pollen zones IV - VI, Zone IV being termed "Pre-Boreal" by many authors. At the beginning of Zone IV birch was dominant, and pine was appearing. In Zone VI pine and birch were joined by mixed-oak (oak, elm, and lime). In certain areas hazel spread wildly but fell off before the end of the Boreal.

The Atlantic period, corresponding with Zone VII, was milder and more humid. Mixed-oak forests reached their peak, accompanied by alder.

The Sub-Boreal is supposed to have been again drier and more Continental and is correlated with Zone VIII. Some consider this

period merely a transitional phase between Atlantic and Sub-Atlantic (Zeuner, 1950, 62). Mixed-oak, alder, and hazel retreated; pine increased, with beech and spruce appearing as subordinate elements. Iversen (1941) sees the sudden decrease in mixed-oak just above the Zone VII - VIII boundary as an indication of land-clearance. Associated with this decrease in the pollen diagrams is a layer of charcoal, followed by a general decline in all tree pollen and a threefold increase of herbaceous plants. Plantain (Plantago) was present in all Iversen's diagrams. (This plant is typically associated with European cultivation all over the world.) Only a small amount of cereal pollen was present, but since most cereals are self-pollinators the small quantity of grain pollen is not surprising. After the forest clearance, represented by the charcoal layer, birch was the first tree to reach a maximum, as it does characteristically following a forest fire. On the cleared land there was a preponderance of Plantago lanceolata, a species of plantain which grows where grazing animals keep the vegetation low. All this evidence suggests agriculture was introduced in Denmark immediately above the Zone VII - VIII transition, and there is some evidence that it was introduced even earlier (Troels-Smith, 1954).

In Zone IX, the Sub-Atlantic, beech gained dominance over oak, and spruce extended its domain. The climate was cooler and more oceanic, and forest demolition continued.

Shortly after the advent of the Postglacial period, reindeer and the giant Irish deer, as well as horses and bison, virtually

disappeared. The ox (Bos primigenius) and elk became the major large mammals, although elk declined after the Boreal. Animals like red deer, wild pig, bear, and dog were present throughout the period. Immediately following the Zone VII - VIII transition, of course, domestic animals were introduced by the first Neolithic settlers.

English pollen zonation agrees with that of Denmark up to Zone VII, at which point they diverge. Zone VII (Atlantic) is represented in England by VIIa and Zone VIII (Sub-Boreal) by VIIb. Late in England's Sub-Boreal a transitional zone VII - VIII is recognized. English Zone VIII (Sub-Atlantic) then corresponds with Zone IX.

Jessen (1949, 104-107) made some alterations in his previous zonations for Ireland which bring the latter into harmony with England. However, these changes may lead to confusion if the reader of pre-1949 articles does not keep them in mind. Mitchell (1951, 117) gives the following table for synchronizing the two systems:

Papers 1938-1948	I	II	III	IV	Va	Vb	VI	VII	VIII
Papers 1949 and later	I	II	III	IV	V		VI	VII	VIII

The North German and Swedish-Norwegian zonings are entirely different from the others and may be seen in Fig. 3.

Within the major zones are fluctuations called "recurrence surfaces" (RS or RY) caused by minor climatic changes which allowed peat to dry on the surface, whereupon new peat deposits accumulated on the weathered surface (Godwin, 1946). The recurrence surfaces subdivide the zones and allow correlations to be established between various bogs.

Postglacial variations in sea-land relationships provide further possibilities for relative dating. The changing levels of land and sea are caused by two factors: eustatic rise of sea level as the glaciers released huge amounts of water and isostatic rise of land surfaces as the weight of the ice was diminished. As the earth's surface lifted the old beach lines were raised. These beaches are not horizontal but rise northwards or inland (where the greatest depressions occurred), thus making it possible to trace the history of the Baltic basin (Zeuner, 1950, Fig. 14).

The first phase of development was the Baltic Ice Lake of Late Glacial times. Initially covered with ice, it formed a melt-water lake as the ice began to retreat. During the early Boreal period, salt water entered what is known as the Yoldia Sea, though it was still a glacial lake by virtue of the fact that its northern shores were composed of ice. Following this isostasy exceeded eustasy, and the Baltic was again land-locked. This second fresh-water stage, the Ancylus Lake, ended when water poured in from the ocean through the North Sea, forming the Litorina Sea. The present shoreline is generally lower than that of the Litorina Sea.

During the Litorina phase unequal isostatic and eustatic rises caused oscillations in beach formation. These are the Litorina transgressions, four of which have been recognized in Denmark and occurred as follows:

(1) Early Atlantic (beginning of Zone VII)

(2) Middle Atlantic (Zone VII)

(3) Late Atlantic (end of Zone VII)

(4) Sub-Boreal (early in Zone VIII)

The Sub-Boreal transgression was the maximum Litorina transgression of Denmark and Scania. It is very difficult to draw parallels with other parts of Northern Europe. Although the importance of the transgressions perhaps has been overrated, they have been of considerable use for determining archaeological correlations within limited areas (Zeuner, 1950, 78).

The First Inhabitants

During the Late Glacial period the ice sheets prohibited human occupation of Scandinavia, except during the Allerød phase of moderated climate. However, there were groups of hunters living immediately below the glaciers in northern Germany. A reindeer-hunters' settlement of Meiendorf represents the earliest cultural horizon of the Baltic area. The Hamburgian culture is assigned to Zone I (Older Dryas). Neither forest fauna nor woodworking tools appear in the archaeological remains. Essentially, it is an Upper Palaeolithic culture, the material resembling East Gravettian more than Magdalenian.

The flint-work includes zinken, blade scrapers, shouldered points, burins, and awls. Burins were used for levering out antler splinters and zinken for prying out the cancellous tissue underneath.

Among the bone and antler tools are uniserially barbed antler harpoons, double-pointed objects, knives made on reindeer ribs, and curved antler handles with slots for flint inserts ("thong-cutters"). The harpoons differ somewhat from Magdalenian forms, notably in the upturning of the lowest barb (Clark, 1950, 89). At Meiendorf also was found a thin amber plaque perforated through the center.

Meiendorf seems to have been a summer camp occupied by hunters following the reindeer north. There are indications that the first reindeer killed was thrown in the lake as an offering.

A number of Hamburgian sites are known in Holland, especially in the Drenthe area northeast of the Zuider Zee. At least four more lie immediately south of the Zuider Zee (Bohmers, 1947, Pl. 33: maps 1 and 2).

At Bromme, near Sǿro, in central Zealand, a crude flint industry marks the first certain penetration into Denmark, which occurred during the temporary improvement of climate during Zone II. The Bromme complex includes tanged points of a type previously related to Lyngby, but there were no Lyngby axes or any other bone or antler tools. A number of scrapers, core scrapers, burins, and sandstone "shaft-straighteners" were also found. The few faunal remains were dominated by elk, for which the heavy points were perhaps developed.

The origins of Bromme, according to Rust (1951, 50), may lie either in late Hamburgian or new elements from the southeast.

At Stellmoor, again in the Hamburg region, Rust (1943) found characteristic flint-work with bone and antler forms in a Zone III (Younger Dryas) deposit immediately above a Hamburgian occupation. The tanged points are much like Swiderian ones but lack the inverse retouching. Scrapers include keeled, horseshoe, and end-of-blade types. Burins and primitive microliths are included in the flint inventory, and antler tools are typified by "Lyngby" axes and harpoons with angular, biserial barbs. Wooden arrows had slotted, rounded, or pointed tips.

About twice as many Lyngby axes were found at Stellmoor as were previously known all over northern Europe. Nearly one-half of these were hammers or clubs, the rest axes and adzes. Therefore, it would seem doubtful that an independent Lyngby culture ever existed (Clark, 1950, 90). It is highly improbable that Lyngby "axes" could ever have been used as chopping implements because of their light weight. However, Childe (1942), who points out the fact that antler "axes" and "chisels" were used in the Palaeolithic of south, east, and central Europe, suggests such tools were handled wedges for use in wood-working. These tools also might have functioned as clubs or blubber mattocks.

Bohmers (1947, 178) reports Ahrensburg-type flints from a site at Vessem in Brabant, Holland. The tool types are shown in Bohmers, Pl. 32.

Although Ahrensburg lay directly above a Hamburgian level at Stellmoor, the two appear to have been separated by some thousands

of years. If this is true, any direct relationship between the two seems unlikely. Also, the tools and antler-working techniques were different from those of the Hamburgians, making a direct descent from the latter even less likely. Nor is the flint-work of Bromme similar enough to that of Ahrensburg for it to be considered ancestral (Childe, 1950, 28). Schwantes (1952, 98) would equate Ahrensburg with Swiderian.

The question has arisen whether these cultures are Mesolithic or Upper Palaeolithic. Clark (1950, 91-2) believes the Late Glacial-Early Postglacial (III - IV) boundary is the decisive factor, since it marks the beginning of forestation, and terms them Upper Palaeolithic. The absence of true axes supports this division.

Maglemose

This stage in the Baltic area coincides with, and may have been largely a result of, drastic changes in ecology. The Pre-Boreal (Zone IV) marks the beginning of the Early Postglacial period when Scandinavian forestation began and forest fauna replaced tundra animals. Maglemose (Mullerup) culture shows in its material equipment an adaptation to both lacustrian and forest environments. Bird, mammal, and fish remains in the settlements are predominantly those of forest and inland-lake species. Apparently, Maglemosians were semi-nomadic, living in small groups and migrating seasonally. Sites are usually found in what are now low-lying bogs or fens, and these represent only seasonal hunting places. The Maglemose

tradition was centered in Denmark and south Sweden but extended, at least to some degree, over much of Northern Europe. It is difficult to trace Maglemose distribution precisely, since many of its flint and stone types still prevailed in the Neolithic, and organic material remained intact only under exceptional conditions. Becker (1953, 180) has called attention to the fact that we are dealing with a series of groups with considerable differences in artifact types. Even within Denmark several groups must be dealt with, but unmixed settlements and bone or antler remains are all too rare for recognizing clear distinctions.

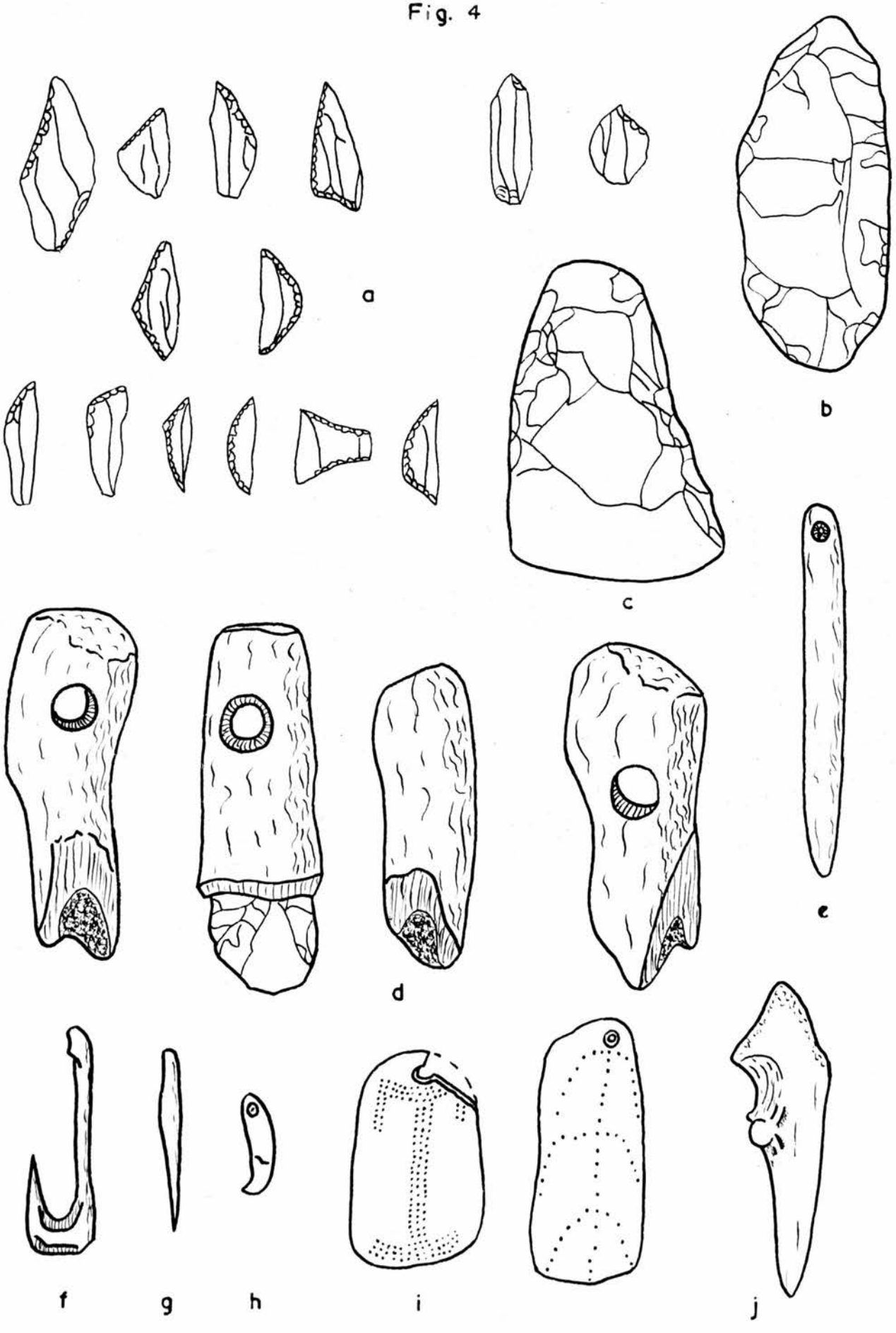
Maglemose flint-work includes a microlithic element, as well as microburins (Fig. 4: a). As in early Tardenoisian, transverse arrowheads are relatively rare. Angle, medial, and polyhedral burins occur in the earliest phase. Among the heavy tools, core axes and adzes predominate (Fig. 4: b), but a few flake axes (Fig. 4: c) begin to appear. Core picks and chisels are also present. Other lithic elements are maceheads with hour-glass perforations, pebble tools, and flake, blade, disc, and core scrapers. Typical but not numerous are narrow, awl-like points (which are also typical of Star Carr).

Fig. 4. Maglemose artifacts.

a: microliths and microburins
b: core axe
c: flake axe
d: antler axes and sleeves
e: perforated bone object
f: barbless fishhook
g: bone awl
h: perforated animal tooth
i: pit-decorated ornaments
j: ulna dagger

(After Clark, 1936.)

Fig. 4



Wooden artifacts include "pikes," clubs, sleeves for the insertion of flint blades, blunted and slotted arrows, composite bows, and paddle-rudders. Antler and bone work unfortunately has not been preserved from the earliest settlements, although the Star Carr site in eastern England gives us some idea of what such material may have been like in Scandinavia. Bone was widely utilized for barbed points (Fig. 5: top) for hafting as multiple-pronged leisters, barbless fishhooks (Fig. 4: f), double-pointed gorges, awls, and a variety of plain bone points. One peculiar bone type (Fig. 4: c) perforated at one end may have served as a needle for plaiting nets (Clark, 1956, 114). Perforated axes and adzes, handles, and sleeves were commonly made of antler (Fig. 4: d). The elbow-bone dagger frequently appearing in Ertebølle is rare in Maglemose (Fig. 4: j). During the Boreal period the first nets and funnel-shaped traps appeared. Amber was used for making pendants, some of which are zoomorphic (Mathiassen, 1952).

Art was largely a matter of decorating utilitarian objects, although antlers are sometimes decorated without having any apparent function. Engraving was accomplished by pricking, drilling (Fig. 4: i), or incising. Motifs include accentuation of cracks or scars, geometric patterns (zigzag, chevron, net, checker, etc.), and biomorphic

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Fig. 5. Maglemose and Obanian barbed bone points.
top: Maglemose (after Clark, 1936)
bottom: Obanian (after Lacaille, 1954)

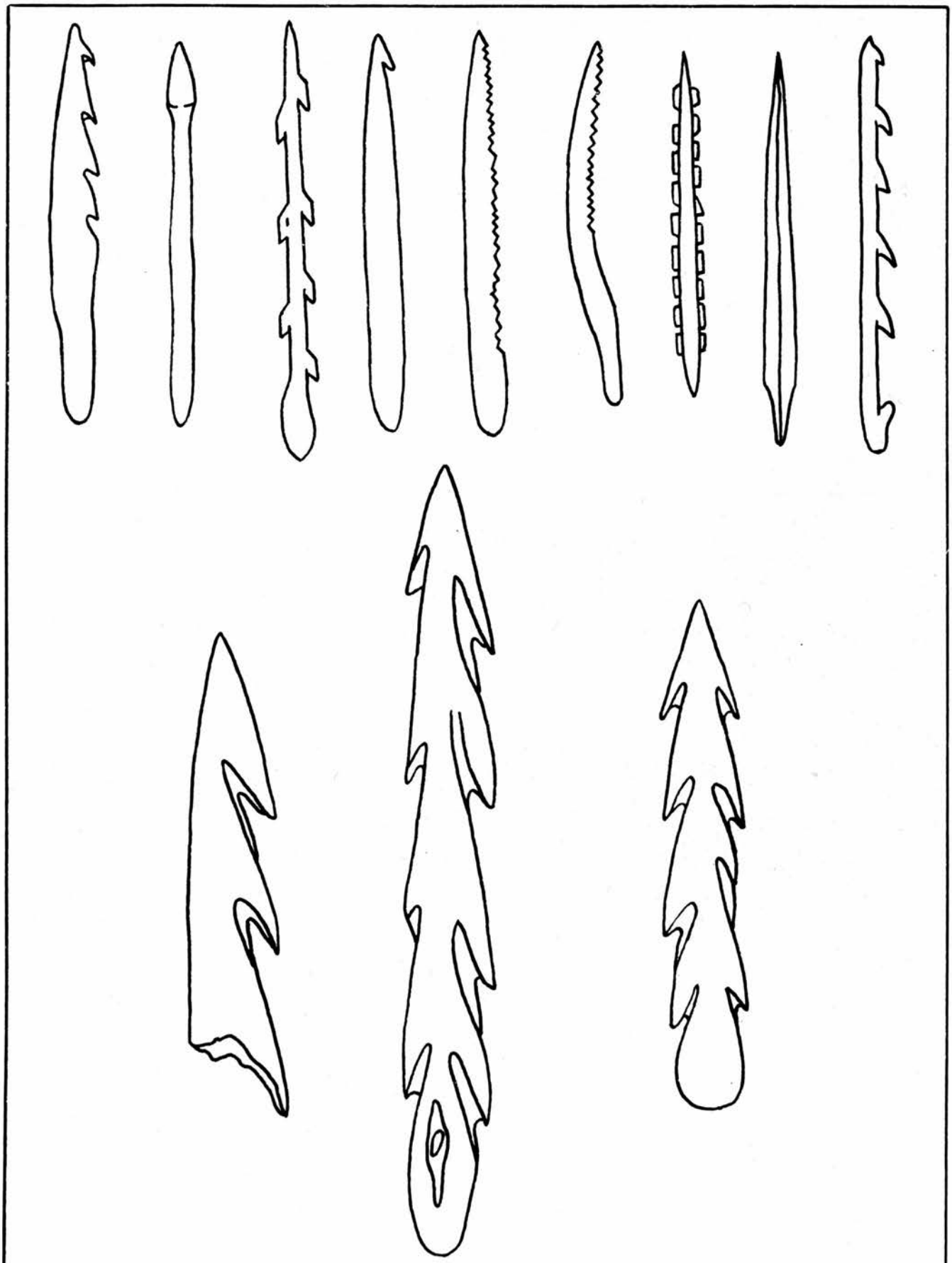

Fig. 5

representations which are symbolic rather than naturalistic. In central Zealand was found an aurochs metatarsal with five human figures incised upon it (Brøndsted, 1940). A moderate percentage of the geometric ornamentation is also found in Magdalenian (Clark, 1936, 179).

Microlithic and burin elements and many art motifs have their roots in the Upper Paleolithic; the heavy element of woodworking tools, some of the fishing paraphernalia (nets, hooks), and drilling apparatus are Mesolithic innovations (Ibid., 131).

Klosterlund, on the shore of the Bølling Sø in central Jutland, is the earliest Maglemose site (upper IV), typologically and chronologically. Implements include flake, blade, disc, and core scrapers; microliths (mostly primitive blunt-edge types, the rest scalene or isosceles triangles); angle, medial, and polyhedral burins for bone and antler work; small, crude core axes and a few flake axes; narrow, awl-like points; and a very few microburins. Closely approaching Klosterlund are Bøllund and Hadsund Syd in eastern Jutland. None of these sites has any organic material.

Pinnberg, in the Ahrensburg tunnel-valley, has been referred to Zone IV (Pre-Boreal) along with Klosterlund. This complex includes heavy "Lyngby" points (as well as smaller tanged points), microliths, and rough core and flake axes. However, the status of the site is somewhat confusing; it may possibly represent a mixture of two or three cultures (Clark, 1950, 92). As at Klosterlund there were no organic remains, although the stone tools were supplemented by five irregular hut foundations (Rust, 1938). Freundt (1948, 44-5) feels that something like Pinnberg was the most likely predecessor of Komsa-Fosna.

Bølllund (Vebaek, 1940) is seen as a connecting link between the Klosterlund stage and Gudenaa, though more closely approaching Klosterlund. The flint technique is similar to that of Klosterlund but more advanced. Artifact types are generally the same, but at Bølllund microliths make up more than 50 per cent of the implements. Triangles are numerous (20 per cent of the total), and there are no transverse arrowheads, trapezes, or rhomboids--which do occur in Gudenaa. No real core or flake axes have been found. Pollen analysis suggests a date in Zone VI.

It is now clear that the island of Bornholm had a strong Maglemosian occupation during the Boreal period, although the implements were somewhat conditioned by the character of the local raw material (Becker, 1951a, 171-2). Unfortunately, no bone or antler was preserved in cultural context. Becker believes the industries are allied to (1) Svaerdborg and (2) Bølllund. Two bogs on the island yielded six bone points and an elk-horn adze with a slotted edge for an inserted blade, all belonging to Zone III or IV. Similar adzes are known from Estonia (Kunda) and Poland. Becker believes the implements may date back to the time of Pinnberg (Ibid., 177). The bone points are as follows: one barbless, one double-barbed, three with two barbs on one side, and one with three barbs on one side.

Mullerup of Zone V is the earliest Zealand Maglemose. The blade technique is poorly developed, and in contrast to Jutland microliths show little variety. Core axes predominate though most are "atypical" or "asymmetrical."

To Zone VI belong Svaerdborg, noted for its fine microlithic technique, and the sites at Holmegaard. In Holmegaard IV were found two wooden bows with pointed and blunted arrows. Few of the arrows had stone or bone points, although some had slits for inserted barbs. Both these sites in south Zealand are characterized by excellent flaking of a strong microlithic nature, as is the site of Lundby. Becker (1953, 182-3) suggests a chronological sequence may be set up for Zealand on the basis of Holmegaard and Svaerdborg. While the flint axes and bone/antler implements change only slightly, a number of smaller flint implements prove chronologically valuable. The stages are as follows:

1. Mullerup, Lundby II
2. Lundby I, Holmegaard V
3. Early Svaerdborg, Holmegaard IV
4. Middle Svaerdborg, most of Holmegaard I - II
5. Late Svaerdborg, upper Holmegaard IV

Although the distinctions are rather fine, Becker feels at least two chief groups, consisting of stages 1 - 3 and stages 4 - 5, may be distinguished.

In western Zealand the site of Aamosen has produced a good cross-section of Maglemose partly mixed with Ertebølle elements. Approximately sixty sites are known in the moor, which has been the scene of intensive archaeological exploration. A few of the major sites are described below.

Vinde-Helsinge (although not in the bog itself) is the oldest site, contemporary with older Mullerup and exhibiting many of the same

features. Asymmetrical pickaxes predominate, the blade technique is poor, and lanceolate and triangular microliths are numerous. Bone and antler remains include antler chisels, plain and barbed bone points, and fishhooks. Vinde-Helsinge probably should be placed in Zone V.

The site of Kongsted yielded no organic material. The flint-work consists of early pickaxes, excellent blade work, scrapers, knives, and burins. Some of the microliths are the same sort as characterize the inland Gudenaa Culture, e.g. transverse and oblique arrowheads. The site of Hesselbjerggaard is very similar. Mathiassen (1943, 208) suggests both sites represent Gudenaa transplanted to Zealand. This complex is placed in the late Boreal (Zone VI) period (Troels-Smith in Mathiassen, 1943, 218).

Maglelyng (Late Atlantic) appears to be a Maglemose site with Ertebølle influences. One coarse potsherd was found. No Gudenaa admixture was recorded here.

The three stations of Hallebygaard, Kildegaard, and Tingbjerggaard are closely related culturally and chronologically. There are late Ertebølle elements (tranchet axes and transverse points) as well as Maglemose elements in the microlithic tradition. In addition, the Early Neolithic is represented by polished axes and decorated pottery. All three sites, therefore, are placed in Zone VIII.

The largest Aamosen site is that of Øgaarde, in which there were evidently two occupations. The uppermost level is a relatively thin stratum containing Neolithic elements, representing a settlement of Mesolithic hunters and gatherers during the Early Neolithic period.

A single shallow dish (Ibid., Fig. 47) suggests the time level was not far removed from the Middle Neolithic.

The main occupation of Ø gaarde belongs to Zone VI, although there are slight indications of a still earlier occupation. Pickaxes predominate over tranchet axes. The blade technique is excellent; tools made on blades include borers, scrapers, knives, and burins. There are a number of transverse and oblique points, among which are a group of large, very oblique points ordinarily found only in the early coastal culture (Carstensminde-Gislinge Lammefjord). Large numbers of Gudenaa-like microliths occur. Bone tools are like those of Maglemose and are often richly decorated. Most important was the discovery of coarse, thick pottery in these supposedly Boreal beds. A piece of sun-dried pottery was found in the earliest level. Since early coastal elements are present and the stratigraphy leaves something to be desired, the possibility that the pottery belongs to Ertebølle is rather strong, and we may reject this "Boreal" ceramic material with considerable justification.

Maglemose is a site on which Worsaae worked as early as 1862. The material is mixed, but there are apparently two occupations: one much like early Ø gaarde and another representing a later Mesolithic group corresponding to that at Kildegaard.

Thus, the Aamosen finds represent a cross-section of Mesolithic culture from early Maglemose to Megalithic times. Represented in the various sites are early Maglemose (Mullerup) of Zone V, late Maglemose (Svaerdborg) of Zone VI, Maglemose bearing a Gudenaa stamp of Zone VI, Maglemose with influences from both Gudenaa and early coastal culture

of Zones VI and early VII, Maglemose with Ertebølle influence of late Zone VII, Late Ertebølle culture with Maglemose and Neolithic traits of Zone VIII, and pure Neolithic culture of Zone VIII. Aside from the last stage, Mathiassen feels there was a continuous occupation absorbing new elements from without as time went on. It is more likely that the Aamosen sites represent seasonal occupations by different groups, and that the cultural material is mixed. Becker has shown that all the Zealand Maglemose settlements were summer encampments only (with the possible exception of Holmegaard V). Due to water encroachment the occupation levels were not deposited horizontally but diagonally, giving an illusion of larger size (Becker, 1953, 181). This is especially true at Svaerdborg, where the levels are not superimposed but juxtaposed. Probably no more than one family lived at the same time in any one of these bog settlements.

Althin (1954) uses the site of Agerød I as a foundation upon which to build the latest Mesolithic chronology of Scania. With this material and that from other sites a three-fold division of the Mesolithic is derived. The stages as defined are typological only and are as follows:

I: This phase is supposed to be contemporary with the earliest southwest Baltic Mesolithic, i.e. the "Tanged Point Cultures." However, the sole evidence consists of stray reindeer-antler picks; there are no sites.

II: The Maglemosian stage has four subdivisions:

a. core axes predominant; blade technique poor; small flake scrapers and microliths. The

type site of Henninge Boställe is felt to be the Swedish equivalent of Klosterlund.

b. core axes predominant; better blades; rough microliths; introduction of keeled scrapers and handle cores. Lower Ageröd I is the type site.

c. core axes predominant, but flake axes appearing; flake and blade scrapers; good blade technique; microliths made on narrow micro-blades. This stage is represented at Ageröd I, section C, level 3.

d. core axes still predominant; excellent blade and micro-blade technique; blade and flake scrapers; microlithic work includes the broad trapeze. Upper Ageröd I is typical.

These last three subdivisions are equivalent to "Zealand Maglemose."

III. The final stage represents south Swedish Ertebølle.

Scanian Period II (Maglemose) sites are always on lakes, and all are on water systems draining to the west.

The results of this classification are not entirely convincing.[1] For one thing, mixed Mesolithic-Neolithic sites make it difficult to separate the material satisfactorily. The scarcity of organic remains

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1. See also Professor Clark's (1955) review of The Stone Age Settlement of Scania I.

is a serious deficit when it comes to judging the relationships between Period II sites or between Period II and the coastal (Ertebølle) stage. The bone and antler work for Agerød I is unreliable stratigraphically, but includes the following types: leister prongs with fine or coarse barbs (the former on a broad, flat point or a cylindrical one); antler sleeves (either split to facilitate flexibility in gripping the flint edge or without splitting); antler axes (edge formed by cutting from both sides of the stem or consisting of part of the frontal bone); one socketed bone axe; bone chisels with hollowed, blunt edge or flat, pointed edge; and slotted bone points, cylindrical or broad and flat. There are also clubs, picks, perforated animal teeth, and "fabricators."

Art motifs on Scanian material fall into the framework of northern Mesolithic art, with two exceptions. One of these is comprised of sandstone slabs with incised decoration, most of which is geometric. One zoomorph of a fish is a simple outline with cross-hatched filling (Maglemose technique). The second group consists of flint with incised ornament on the cortex.[1] Both are well-known in the Upper Paleolithic and Mesolithic of Western Europe (Althin, 1950, 258).

Corresponding to Maglemose in the eastern Baltic is the Kunda culture, centered in Estonia but extending into the Russian forest zone and east of the Urals. This Russian material is, however, chiefly Neolithic in time (Мугрлй, 1950, 6). In Finland are the three

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1. One handle core has lines incised upon it anticipating the shape of micro-blades.

related finds of Antrea, Kyrksl&tt (Kirkkonummi), and Heinola. There is also some Kunda-like material in Poland and East Prussia.

In Kunda quartz implements are relatively numerous because of the scarcity of flint. As a matter of fact, throughout the Mesolithic (when trade was not yet highly developed) large flint implements were scarce (Indreko, 1948, 107-8). Also for this reason flint projectile points are subordinate to those of bone in the archaeological record. The flint points which do occur are mostly tanged. Other stone tools include subtriangular implements of flint and quartz, quartz saws (?), quartz burins, unretouched flakes with a sort of graver tip, primitive flint and quartz zinken, flint and quartz scrapers of various forms, quartz awls or borers, hollow chisels of stone, thin flint blades used as inserts for composite tools, sandstone whetstones, and unperforated stone axes based on core axes. Since quartz and quartzite are such intractable materials, it is scarcely strange that no true microliths occur in either Finland or Estonia.

As in the western Baltic a large number of bone and antler types are recognized. There are antler axes with and without perforations (elk-antler axes being typical), hollow-edged bone gouges, antler shaft-straighteners or bâton de commandement, barbed bone points, antler "arrowheads" with extremely long tangs, conical bone points, fishhooks, awls, and needles. Some of the larger points are slotted for flint inserts. Two bone types typical of the eastern Baltic but absent in Maglemose are socketed spearheads and heavy "icepicks." The axes of elk antler are paralleled by one of early date on Bornholm

(Becker, 1951a, 177) and others in Norway (Gjessing, 1945, Fig. 54).

In Finland, the richest finds are from Antrea on the Karelian Isthmus in southeast Finland. Here were found remains of bone and stone implements as well as a net of tree fiber. The stone tools include axes with pointed butt and oval cross-section. A type of bone spearhead with a groove for quartz splinters on one side also is present in Kunda and Maglemose, except that the inserts are of flint. The other two most characteristic bone types are hollow chisels and elk-antler axes similar to the stone axes (cf. Äyräpää, 1950, Fig. 4: c and 4: d). At Heinola a complete sled-runner was found.

Allowing for local specialization and the differences in raw material, Kunda culture was very close to Maglemose in its general economy. Many features illustrate a close affiliation with the Arctic (Circumpolar) Stone Age. Kunda and its successors undoubtedly contributed heavily to the cultural content of later Circumpolar cultures. Äyräpää believes the Kunda people represent a group which, after the final ice age, moved into the eastern Baltic from east central Europe in close contact with Maglemose and formed the core of the Stone Age settlement there. Kunda was one of the heaviest contributors to the equipment of the Neolithic Pit-Comb Ware culture in the same area.

British Maglemose

Much of Britain may be considered a western outpost of Maglemose, perhaps in a larger sense than the eastern margins of the same culture

in Estonia and the U.S.S.R. (Piggott, 1954b, 9-10), and in the far north there are traces of Circumpolar Stone Age infiltrations.

A parallel of Klosterlund in Zone IV is Star Carr in Yorkshire. The age of this site by radiocarbon dating is c. 9488 years. The actual dwelling area was a brushwood platform originally located on the edge of a lake, where two occupations (perhaps separated by only one season) are suggested (Clark, 1954, 9-10). Hunting undoubtedly was the chief occupation.

More than half of the microliths at Star Carr are obliquely blunted. Geometric forms include triangles, elongated trapezes, rhomboids, and crescents. Tanged flakes, saws, awls, core scrapers, flake and blade scrapers, burins (and combination burin-scrapers), microburins, and core axes fill out the flint inventory. Of seven core axes at least two appear to be adze blades.

Antler was utilized much more than bone. Of 191 barbed points all but four are certainly of stag antler, and all are uniserially barbed. In most cases the barbs are fine, but some have relatively coarse barbs. Only one of the points is perforated at the base.

Antler tines were bevelled down for use as tools, and elk antler provided perforated mattock-heads. Elk metacarpals were used for pins. Ox-bone scrapers with a hollowed edge closely resemble Eskimo tools for working caribou skins.

Beads and pendants were made of amber, shale, animal teeth, and bird bone. The perforations suggest bow-drilling (Ibid., 166). Numerous tightly-wound birch-bark rolls were recovered, and resin

was widely used, especially for hafting implements. Vogt (1949) has discussed the wide use of birch-bark as a raw material during the Mesolithic and Neolithic.

Unique at Star Carr are stag frontlets having worked portions of antler still in place. Perforations suggest they were worn as headdresses for either hunting or ceremonial purposes. These recall the occurrence of similar attire on Téviec skeletons.

Other than part of a paddle-rudder, few indications of wood-working were noted.

Among the fauna represented were red deer (80 per cent), roe-deer, elk, ox, pig, and a number of smaller mammals. There are some indications of fowling but not of fishing.

The flint industry is very much like that of Klosterlund, although the latter contained no organic material for comparison. The microlithic series resembles that of Duvensee in Schleswig-Holstein. The microlithic element at Broxbourne, the sole well-dated British Boreal site of Maglemose affinities, is not numerically sufficient for comparison.

Broxbourne, a settlement on the Lea floodplain in Hertfordshire, with its microliths, microburins, burins, core axes, scrapers, and quartzite hammerstones, is also assigned to the Maglemose culture-area (Clark, 1936, 236).

A Maglemose harpoon of late Zone IV or early V was dredged up from the Leman-Ower Banks of the North Sea, and another came from Skipsea, Yorkshire (Zone VI).

In southeast England, a number of Mesolithic stone maceheads with hourglass perforations have been discovered (Rankine, 1949), and the affinities of these implements also seem to be with Maglemose.

The antler axe-hammers found in association with whale skeletons on the Firth of Forth are certainly Baltic forms, and subsequent investigations in eastern Scotland should bring to light settlements related to those in western Scotland (Obanian), demonstrating that all Scotland was closely tied to the Baltic sphere of influence.

The Obanian culture of southwest Scotland has long been attributed to Azilian influence, but it now seems clear that this complex is to be related to the Northern Forest Cultures. The assumed "Azilian" influence appears in certain barbed antler or bone points (Fig. 5: bottom), whose crudity produces a misleading resemblance to Azilian harpoons. Other features, however, indicate the Baltic affiliations of Obanian.

Obanian, like Ertebølle, had an economy geared to a maritime environment. Although land animals were hunted, the presence of seal, dolphin, rorqual, sea-birds, shellfish, and deep-sea fish (Lacaille, 1954, Table V) illustrates the dependence on marine resources and implies the use of boats.

Among Obanian bone and antler implements are finger-like, end-worn slivers, chisel- and adze-like tools, barbed points, plain points, and awls and pins. Examination of Obanian material at the Scottish National Museum, Edinburgh, reveals fragments of perforated antler mattocks like those found on the Firth of Forth. The stone

industry is composed of narrow pebbles ("limpet hammers"), heavy pebble implements, picks, choppers, chisel-like forms, and a variety of flake and blade tools. Tranchet edges on some of the axes show Baltic influence.

There are in addition strong affinities within Obanian to Irish Larnian, but these are subordinate to the bone and antler work (Movius, 1953, 94). Obanian is probably younger than Late Larnian; it hardly can be earlier than late Atlantic (Lacaille, 1954, 239).

A few stray finds of Maglemose-type barbed or slotted bone points and one antler sleeve are recorded for France and Belgium (list of finds in Clark, 1936, 231 and 237), but there are no sites attributed to Maglemose.

Gudenaa

The status of Gudenaa culture (Mathiassen, 1937) is rather tenuous at the present. It is supposed to be an independent culture of interior Jutland which overlaps Maglemose at one extreme and the Neolithic at the other. Since Gudenaa finds are from open stations, and no organic remains have been preserved, satisfactory comparisons with Maglemose and Ertebølle are impossible. The industry is characterized by a good flaking technique and the following flint types: core and flake axes, transverse arrowheads (some oblique), microliths, burins, blades, awls or borers, and core-, blade-, and round-scrapers. Mathiassen draws a distinction between early and late Gudenaa on the basis of the proportion of microliths to transverse points (1948b, 140).

By all appearances there seems little except the proportion of flint types to separate Gudenaa from either Ertebølle or Maglemose. Its leading implement forms are duplicated in either one or both of these other two Danish cultures. Althin (1954, 159) prefers to interpret Gudenaa as a number of occupations which lack stratigraphy. If Gudenaa is not to be regarded as an independent tradition, it may be that it was an inland facies of Ertebølle, particularly in light of the transverse arrowheads.

In Schleswig, the Oldesloe group corresponds to Danish Gudenaa (Schwantes, 1952, 106).

Ertebølle

Ertebølle for the most part represents an extension and development of Maglemose techniques. The sites, however, are predominantly coastal, and the difference in environment is reflected in the faunal remains (Clark, 1936, 51 and 1952, 37-8). On Ertebølle sites sea-mammals, such as seal, whale, dolphin, and porpoise, marine fish, and sea-birds are represented. In contrast, faunal remains in Maglemose settlements are those of inland species. Moreover, while the animal bones from Maglemose occupations indicate only summer encampments, the number of mammal bones and the occurrence of winter birds in Ertebølle middens substantiates year-round occupation.

In Ertebølle, there are few traits which cannot be recognised as logical continuations or improvements of native traditions. Flint-work is in general better and more extensive, transverse arrowheads

become almost the sole type of microlithic flint-work, and the proportion of core to flake axes is reversed. Antler sleeves and adzes tend to drop out, as does ornamentation of antler and bone.

End-scrapers and burins are typical, especially angle burins. Pseudo-awls on the end of blades are new. Stone types show continuity with Maglemose in types like perforated maceheads but also include the Walzenbeil (round-butted, pecked axe with ground edge) and the partly polished stone axe of Limhamn type. The Limhamn-type axes appear, however, in late Ertebølle when agriculture was spreading into Denmark and south Sweden (Clark, 1952, 172). Antler axes are common, although the Ertebølle type is perforated through a side-tine to provide a short socket (Fig. 8: inset). Barbless fish-hooks occur again, and bone combs appear for the first time. The most important innovation is pottery, which was made by coiling and is usually brown or gray in color. Surfaces were frequently burnished with a pebble. There are two chief forms: beakers with pointed bases and outcurved rims and oval saucers with round bases. The saucers probably were used with animal fat and moss wicks as lamps (Mathiassen, 1935). Many of the vessels are plain, but some have fingertip or fingernail impressions along the top of the rim.

Work in Zealand has brought to light an early phase in coastal culture dating from the Early Atlantic transgression—Gislinge Lammefjord and Carstensminde. Carstensminde (off Castrup on the island of Amager) shows a good deal of Maglemose influence (Mathiassen, 1948a, 49), such as primitive core axes, rounded greenstone axes,

large oblique arrowheads, deeply incised ornamentation, and lack of pottery. Mathiassen considers Carstensminde to be partly drawn from Ahrensburg, but there appears to be a gap of about 3,000 years between the two.

Gislinge Lammefjord (northwest Zealand) also shows Maglemosian influence and may be a precursor of Ertebølle (Childe, 1948b, 50). A later variant is present at Vedbaek and Bloksbjerg.

Clark (1950, 95) has set up a sequence of coastal cultures which illustrates the progressively increased divergence from Maglemose: Klosterlund (Zone IV), Holmegaard (VI), Carstensminde (VII), Dyrholmen I - II (VII), Dyrholmen III (VIII). Within this sequence the proportion of core to flake axes falls off, decoration of bone and antler is reduced and finally ends, antler adzes disappear, and the new type of antler axe appears.

Dyrholmen I - III represents Ertebølle proper (Mathiassen, 1948a, 49), although there may be a Bjornsholm phase between Dyrholmen I - II. At this site in northeast Jutland, the three occupations were referable to Litorina transgressions and recessions (Mathiassen, Degerbøl and Troels-Smith, 1942):

> Zone I: more core axes than cleavers (none of the late type); isolated Walzenbeile; transverse axes; a number of blade awls; blade knives; flake scrapers; a few simple disc scrapers; many burins (including medial forms) without transverse retouch; a few transverse arrowheads. Bone implements were more abundant than those of stone; deer antler implements usually

had shaftholes through the butt; antler chisels; double-pointed gorges; points of bird bone. Some bone objects were ornamented. There was a number of wood objects, e.g. fish-spear tines. Only a little pottery, always thick-walled. This represented an early level of Ertebølle, apparently older than the next to last Litorina transgression (pre-Late Atlantic).

Zone II: far more flake axes; specialized core axes; isolated Walzenbeile; blade awls (no flake awls); no disc scrapers; only a few flake scrapers; many blade scrapers; angle burin with transverse retouch dominated; blade knives rare; transverse arrowheads abundant. Few bone implements: perforated (through the tine) antler axes; a few bird-bone arrowheads; shoulder-blades with rings cut out. Neither transverse axes nor chisels. A good deal of pottery, mostly thick-walled (pointed-based pots and saucers), but also thin, undecorated pottery. This was late Ertebølle and precedes the last transgression.

Zone III: Mesolithic implement types occurred in mixed proportions as in II, but no bone tools were present. A strong Neolithic element came in: thin-butted polished flint axes; disc scrapers; flake awls; decorated ceramics. Culturally, it was still Ertebølle, based on hunting and fishing.

Zone III seems to have been a continuation of II; perhaps another phase (Bjornsholm) fell between I and II. Typical of Dyrholmen and other Danish middens are large numbers of elk and ox bones. Degerbøl believes the latter may be from domestic cattle. Human bones, scattered all over the middens and showing cut-marks, probably indicate cannibalism.

At Kolind, 20 kilometers east of Dyrholmen, was an even more complete section of four levels:

K IV	D III	(Sub-Boreal transgression)
K III	D II	(High to Late Atlantic transgression)
K II	Bjornsholm?	
K I	D I	(High Atlantic transgression)

Zone I: a number of core axes; no flake axes; blade knives; angle burins without transverse retouch; antler axes perforated through the butt; bone points; elbow-bone daggers; a few ornamented bone implements; a wooden-pronged fish spear. Thick pottery with wavy cord-like decoration.

Zone II: equal numbers of core and flake axes; Walzenbeile; two pointed weapons; angle burins; a few transverse arrowheads; isolated bone points and thick sherds.

Zone III: chiefly flake axes; blade knives and scrapers; transverse arrowheads; a few bone implements; a number of thick and a few thin undecorated sherds.

Zone IV: axes as before but with Neolithic pointed- and thin-butted types; disc scrapers; tongued axes; a few fishhooks. Thick sherds as well as thin decorated sherds of the Early Neolithic period.

Thus, the makeup of Kolind was much like that Dyrholmen, although Kolind I seems a little older than Dyrholmen I. At Brabrand was a similar complex, with the final part falling in the Neolithic.

Intensive pollen analysis at Aamosen has brought to light a distinct agricultural horizon preceding that noted by Iversen in 1941 (Troels-Smith, 1954). Iversen's land occupation phase was characterized by extensive land clearance and pasturage, but the ratio of plants in the first phase suggests an economy based on stable-feeding, as in Swiss pile-dwellings.

Polished, pointed-butted axes and type "A" funnel beakers (Becker, 1948) have been found at Muldbjerg I (Aamosen) in association with typical Ertebølle implements and pottery. Domestic cattle and sheep (or goats) were represented as well as wild animals, and grain impressions were recorded also. There appears to be no question of a mixture of cultural remains, and the settlement antedates the main (land clearance) agricultural occupation defined by Iversen. Recently, Troels-Smith (1956) has reported a radiocarbon date of c. 2620 B.C. for Muldbjerg I.

It is pointed out that virtually no typical or "classical" Ertebølle[1] site lacks domestic animal bones and thin-walled sherds

1. Dyrholmen II onward.

proper to A-beakers, and it is very often possible to associate the decline in elm indicating the collection of fodder (because the trees once polled cease to pollinate) with typical Ertebølle material. Therefore, Ertebølle (excepting the initial stages) seems to have had at least a semi-agricultural economy in which hunting and fishing were complemented by the raising of stable-fed animals and limited crops.

However, Becker (1955) contests this proposal on the basis of an unmixed "A"-Funnel Beaker occupation at Store Valby in western Zealand. Troels-Smith is also accused of ignoring Ertebølle settlements which antedate or follow those contemporary with Early Neolithic A. There is, for example, the fact that typical Ertebølle pots continued long after A-beakers disappeared.

Troels-Smith is convinced that the A-beakers are direct developments of the Ertebølle jars, but this still fails to explain the origin of ceramics in Scandinavia. Domestic plants and animals certainly were introduced from the outside, so there is no reason to assume pottery was not also. Probably both the funnel beakers and Ertebølle jars, whatever their relationship, were ultimately derived from some Continental Neolithic complex. Since funnel-necked vessels are known in early Neolithic contexts on the Continent, it is not impossible that the Ertebølle beakers are degenerate copies of the A-beakers, rather than vice-versa. The Ertebølle lamps or saucers are perhaps special Northern forms related to stone and clay lamps used by the Eskimos of the present day.

In Scania, Althin's Stage III of the Mesolithic is made up of sites which are mostly coastal and represent Swedish Ertebølle. In the earliest phase, as typified by the site of Hälljarp, core axes still outnumber flake axes, and handle cores, micro-blades, and oblique arrowheads are common stone types. In the second phase (Ageröd V and Arlöv I) core axes continue to be dominant, but earlier types of transverse points are more common than the oblique form. Handle cores and micro-blades continue. In the third phase, for which there is no really good type site, flake axes finally become predominant, and handle cores and microliths have disappeared. At this time the Limhamn axe makes its appearance. In the final stage, flake axes retain their dominance, blade-work is excellent, and transverse arrowheads are typical forms. Ertebølle pottery appears for the first time. The type site is Elinelund.

Period III (Ertebølle) sites are on coasts, rivers, or lakes; only the second phase is represented by material from bogs.

Scanian Ertebølle is correlated with Denmark as follows:

III:d	(Elinelund)	Dyrholmen II
III:c	(no type site)	Dyrholmen I
III:b	(Ageröd V-Arlöv I)	?
III:a	(Hälljarp)	Carstensminde

Mesolithic burials in Scandinavia[1] are rare and for the most part inadequately published. Many of the settlement burials recorded

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in the older literature are of dubious antiquity and probably belong to the Neolithic. Four Ertebølle burials (extended) are fairly well authenticated and were located as follows: Korsør Nor (west Zealand), Vedbaek (north Zealand), Bloksbjerg (north Zealand), and Ertebølle.

At Blekaskog, Scania, was found a sitting burial which some assign to Maglemose and some to the Neolithic (Becker favors the former view).

Also at Vedbaek occurred a cremation burial, but the date remains very much in doubt.

The Finnish equivalent of Ertebølle is SuomusjÄrvi culture, which typologically and chronologically succeeds Kunda (KyrÄpÄÄ, 1950, 11). Numerous dwelling-places belonging to this culture are found at or immediately above the maximum Litorina beachline (Zeuner, 1950, 85). In contrast to Kunda-Maglemose and like Ertebølle, the settlements are on the sea coasts instead of inland lakes.

Stone types of SuomusjÄrvi (Ailio, 1909 and KyrÄpÄÄ, 1950) consist of primitively flaked and sparsely polished axes and chisels (most of which have transverse edges), cleavers with oval cross-section, well-polished hollow-edged chisels, perforated maceheads, and rather large spearheads of slate. These slate spearheads seem peculiar to the eastern Baltic--elsewhere bone was used for such points--and provide another link with the Circumpolar Stone Age. Bone and antler remains have been lost except in rare cases, and no pottery has thus far been attributed to SuomusjÄrvi.

The oldest Suomusjärvi finds are designated Laperia, after finds in that area. Other sites are relatively late, such as Sikunsuo and Mäkipelto in Kyrkslätt and Henttala I in Borgå, and are grouped under the term Sikunsuo. In this phase the stone axes and chisels tend to be smaller and show evidence of having been hafted in antler sleeves, which had disappeared in the western Baltic. The final stage is called Kisko, and the leading implement is a stone axe with rectangular cross-section and transverse edge. The Kisko material is earlier than the oldest Comb-Ware dwelling places.

The Võisiku culture of Estonia has axe types identical with the earlier Suomusjärvi ones. In Karelia, the primitive axe forms and slate spearheads of Suomusjärvi were used in addition to the "Ilomantsi" axe, an Olonetz type with a transverse edge, one flat face, and a pointed butt.

Probably Kunda elements contributing to Suomusjärvi entered (1) by way of the Karelian Isthmus and (2) directly into western Finland by sea from Estonia (Kyrälä, 1950, 18).

In Olonetz, there are Suomusjärvi axe types, partly-polished chisels, and a few Walzenbeil forms. Olonetz green slate was imported into Finland over a considerable period. The evidence suggests a contribution to Suomusjärvi from Olonetz as well as from Estonian Kunda (Ibid., 23).

In the north of Finland there are stone types much like those of Suomusjärvi in the south and west. The axes there resemble southern forms, slate spearheads are abundant, and perforated stones are more

numerous. The Finnish perforated picks are divided into three groups: simple (double-pointed), cruciform, and four-pronged. The "picks" perhaps should be included in the same category with the spheroid and star-shaped maceheads of soapstone. All are polished and have hour-glass perforations. Most of these forms are paralleled in Scandinavia (Clark, 1936, Fig. 38: 1 - 3; Montelius, 1922, Figs. 339-40; Gjessing, 1945, Fig. 70).

The so-called "Finnish quartz dwelling-places"—hearths with burnt bone and quartz implements—belong partly to the Suomusjärvi horizon. Some rather good transverse arrowheads of quartz are attributed to this complex. Äyräpää thinks the sites represent temporary encampments of people belonging to the major occupation rather than an independent culture.

Lower Halstow in north Kent has been recognized as the British counterpart to Ertebølle, although the types differ in detail greatly from it (Clark, 1932, 63 and 1936, 158). The most typical and important implement here is the "Thames pick," an axe or pick with tranchet edge which is a "Campignian" form. Core axes were more common than flake axes. Other tools include pebbles with countersunk hollows, a few simple microliths, burins, and rough scrapers of various forms. Neither bone nor antler appeared.

Lower Halstow was pronounced a late Mesolithic site by its discoverer, J. P. T. Burchell. This date has been generally accepted, but the stratigraphy of the site was admittedly very difficult to unravel, and a second site nearby contained both an Ertebølle-type

industry and a decidedly Neolithic industry (Burchell, 1925). Again, the stratigraphy was such that a chronological distinction between the two industries seems questionable. Because of this, it is likely that Lower Halstow was an Ertebølle industry of Neolithic date (Piggott, 1954b, 284). The probability of this is increased by Troels-Smith's (1954) Neolithic date for Danish Ertebølle.

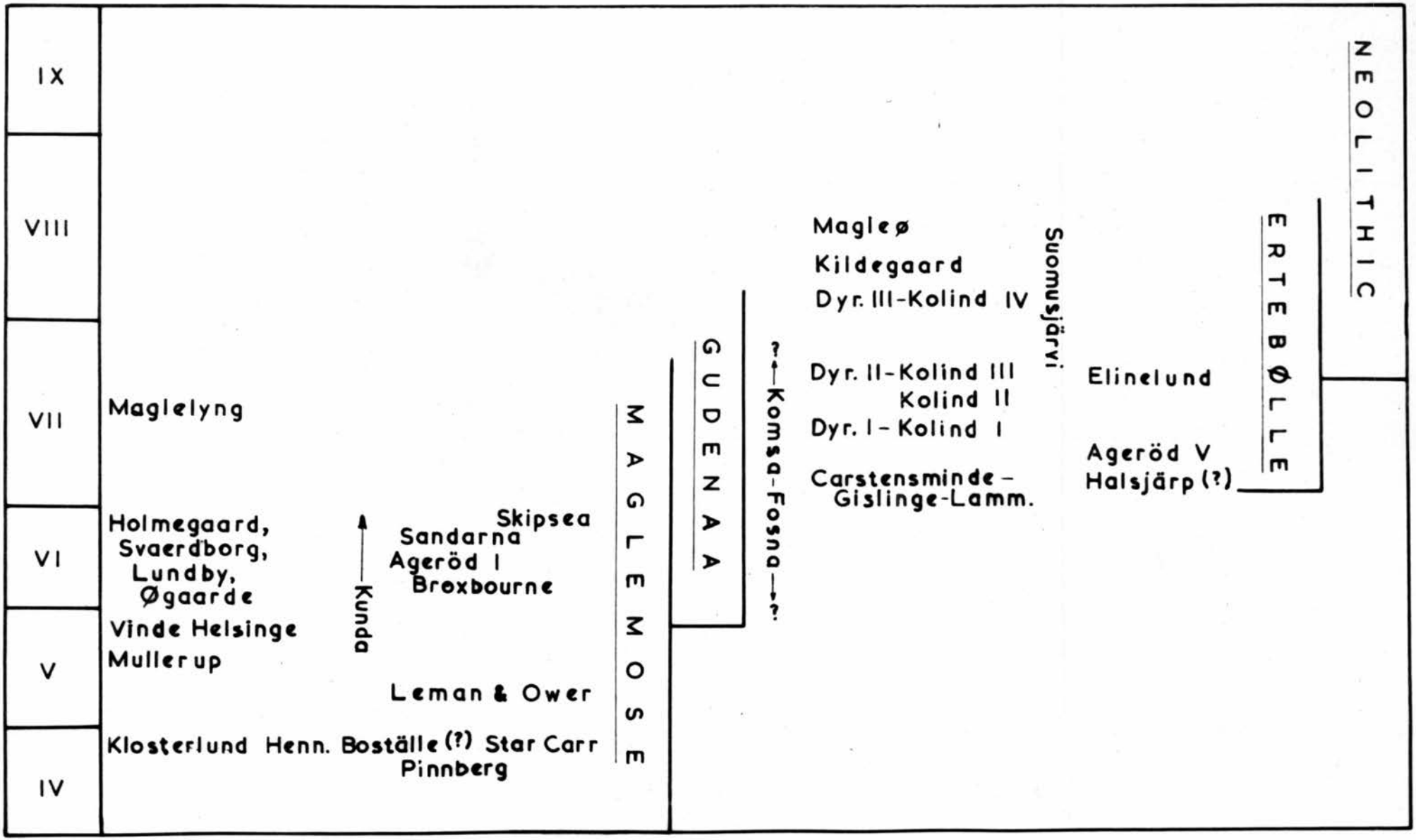


Fig. 6. BALTIC MESOLITHIC CHRONOLOGY

CHAPTER V

KOMSA AND FOSNA

The Komsa culture ("Finnmarkian") is known from sixty-odd sites along the Finnmark coast of northernmost Norway. These people may have been reindeer-hunters who moved north and developed a coastal economy. The sites are very hard to date; the association of some finds with elevated shore lines has been advanced as evidence of a Palaeolithic character. However, there are obvious objections to Komsa's being Palaeolithic.

The culture gives an impression of heterogeneity, i.e. a mixture of macro- and microlithic elements. In general, quartzite was used for heavier tools and flint for the finer. Least important numerically are core tools (axes, picks, plane and core scrapers). Disc scrapers and small sub-triangular points (likened by Bøe to pointes Mousteriformes) are fairly common. Flake axes are important and quite well developed, most resembling those of late Ertebølle type (flat-trimmed). All kinds of scrapers turn up, as well as angle and medial burins, flake knives, and a few flake borers. Tanged points are classified as:

(1) those with a tang with double retouch on the underside, the blade being either untreated or obliquely retouched near the tip;

(2) those with blade and tang on one side merging imperceptibly, the edge retouched along its entire length;

(3) large, thick, tanged points of "Lyngby" type.

Types (1) and (2) are almost microlithic. Transverse arrowheads have been credited to Komsa but not with great certainty.

Microliths occur at most sites though never in large numbers. They resemble Klosterlund types, mostly crude and vague with the lanceolate form predominating. One triangular and one trapezoidal point are the only geometric types known.

A consideration of the archaeological traits makes it quite clear that Komsa could not have been Palaeolithic.

Fosna, on Norway's west coast between Bergen and Trondheim and also in Østfold and west Sweden, is very much like Komsa. The two are enough alike to indicate a "broad continuity of origin," though Komsa may be somewhat older. The Fosna industry includes tanged points, oblique transverse arrowheads, scrapers (core, flake, discoid, blade, plane), burins, blade knives and awls. Flake axes are more numerous than core axes (a majority of the "axes" are adzes). Lanceolate microliths predominate, but narrow trapezoids and triangles also appear. The characteristic types of implements and their frequencies are about the same in both Komsa and Fosna.

Komsa appears to tie in with the Circumpolar culture-area but just how closely is difficult to establish. The ultimate origin of Komsa-Fosna is probably to be found in the early hunting cultures

to the south. Differences between the Northern Stone Age and the south Scandinavian Stone Age may hinge to a large extent upon the absence of good flint in the north (Clark, 1948). Freundt (1948, 53) believes that early Komsa-Fosna sites are about contemporary with early Ertebølle (Dyrholmen II), which means they would barely antedate the Neolithic.

The Nostvet culture of Norway is probably contemporary with Ertebølle and Komsa-Fosna, but its closest relations seem to be in quite a different sphere from that of Komsa-Fosna (Ibid., 55).

At Rå̊o, Sweden, and Varberg, Holland, is an "epipalaeolithic" of wave-deposited flints. There are practically no established types. Implements, such as scrapers, hollow-scrapers, gravers, borers, and handaxes, have a minimum of flaking. In form and appearance they seem close to late Palaeolithic work, especially Aurignacian, and also to Komsa-Fosna (Shetelig and Falk, 1937, 17).

Sandarna is a Swedish settlement near Gothenburg, which Nilsson and Jessen believe to have been contemporary with Lundby-Holmegaard-Svaerdborg (Zone VI) or a bit earlier. It has an array of implements including core axes (dominant), flake axes, pebble axes, a cruciform pick, axes with pointed butt and pointed-oval cross-section, microliths (mostly lanceolate), end-of-blade scrapers, blade knives, blade or flake awls, discoid scrapers, core and plane scrapers, and a single burin.

Outside Sweden there is a tendency to regard Sandarna as Maglemosian, but almost all the forms foreign to Maglemose, e.g. tanged

points, occur in Komsa-Fosna and the reindeer-hunter cultures. Freundt (1948, 68) thinks Sandarna neither Maglemose nor Komsa-Fosna but a special early coastal culture with origins in the Tanged Point cultures, a sort of "Swedish Carstensminde." In apparent support of this a crude Walzenbeil and pseudo-awls on the end of blades, both typical of Ertebølle, were extracted from Sandarna (Clark, 1936, 145 and 148).

CHAPTER VI

THE BASIC UNITY OF MESOLITHIC CULTURES

Of all the European Mesolithic cultures, only those of the Baltic or of Baltic derivation are very well defined, but certain parallels can be detected in the less well known cultures. Probably a greater homogeneity existed among the Mesolithic cultures than most of the literature seems to admit, although the present lack of evidence prevents the exact relationships from being concretely established. Many of the criteria for differentiation are based upon the absence of traits in archaeological records which are acknowledged to be incomplete, and this negative reasoning may lead to inaccurate interpretations. This is not to deny the importance of ecology or the existence of regional variations, but it seems at least as important to point out some of the actual and hypothetical bonds between these cultures as to accentuate their differences.

Maglemose and Ertebølle

Since these two Baltic cultures are the most informative they can best serve as a basis for a generalized analysis of the Mesolithic cultures. Maglemose is characterized by (1) a microlithic industry, (2) a heavy flint industry of picks, axes, and chisels, and (3) a well developed industry in bone and antler. Ertebølle can be summarized as a continuation of Maglemose with an emphasis on coastal rather than

forest-and-lake settlement. Although new artifact types appeared and others disappeared, the differences between Maglemose and Ertebølle are mostly in terms of type frequencies (ignoring for the moment Ertebølle's possible Neolithic content).

The Obanian coastal sites in southwest Scotland, with their Baltic affinities, represent a similar late Mesolithic adaptation to a marine environment. The problem now remaining is to see if these features observed in the Baltic appear in other Mesolithic cultures.

Tardenoisian

Above all other groups, the Tardenoisians emphasized microlithic flint-work. Few heavy implements have been attributed to Tardenoisian, except at the Piscop habitation-workshop, which contained a number of stone and flint picks. The presence of hut foundations here suggests the occupation was of a more permanent nature than most, and if other such sites appear in the future we should obtain more information concerning the use of macrolithic tools by Tardenoisians. One such indication is the presence of a core axe in the Tardenoisian dwelling at Oerlinghausen, Westphalia (Diekmann, 1939). Kozlowski (1926) indicates that Tardenoisian microliths commonly occur "mixed" with Campignian tools in Polish dune deposits, and Clark (1936, 14) treats the presence of an axe and adze element combined with a microlithic assemblage in the "Horsham culture" of southern and eastern England.

The small and incomplete inventory of bone artifacts contains nothing foreign to Maglemose: pointed objects, incised fragments,

awls, gorges, daggers, perforated teeth, and boar's tusk awls and scrapers. At Sauveterre-la-Lémance an antler axe was found in a Tardenoisian level. Harpoons are known only from the Swiss site at Birsmatten, and their affinities seem to be with Azilian types. However, a glance at those from Oban reveals that such barbed points are not characteristic of Azilian alone (cf. Fig. 2: d and Fig. 5: below). At Téviec, we may note the occurrence of antler headdresses (paralleled at Star Carr) and a hint of geometric art motifs.

At Téviec and Hoëdic, we have a glimpse of a Tardenoisian maritime tradition in which shellfish collection was of greater economic importance than hunting. The Tagus shell mounds in Portugal denote similar marine adaptations and appear to have some traits in common with Téviec. A lacustrian facet is pointed out by the Tardenoisian occupations at Federsee.

The microlithic ties between Maglemose and Tardenoisian have been recognized for a long time, but there are other correlations as well. Although the nature of most Tardenoisian sites has prevented the preservation of bone and antler material, what does remain falls within the scope of Maglemosian work. Likewise, Tardenoisian has a coastal subdivision, much of which may have been inundated. The foremost distinction in material equipment is the paucity of heavy tools in Tardenoisian, which probably is explainable in terms of the usual pattern of settlement on non-wooded areas.

Azilian

Azilian also possesses a microlithic industry, although microburins are absent and the numerical ratios of forms differ from those in Tardenoisian. Wood-working tools admittedly are not common, but some antler sleeves (one with an inserted celt) were recovered from supposedly Azilian caves in southern Germany; otherwise there are few indications of an axe-and-pick industry.

A certain amount of bone-work---needles and awls, elbow-bone daggers, polishers, harpoons, perforated teeth, and worked boar's tusk---is known, and again none of it would appear out of place in a Baltic context. The harpoons are crude in comparison with most Maglemosian examples, but similar points occur in Obanian, a Maglemosian affiliate. In fact, on the basis of the harpoons alone, Obanian for a long time was assigned to Azilian. Moreover, we now know such points are also at home in a Tardenoisian context.

That Azilian was associated with Tardenoisian has been recognised for years. Especially in the older literature "Azilio-Tardenoisian" frequently is employed to signify flint industries with both Azilian and Tardenoisian features. Azilian seems to have preceded typical Tardenoisian and probably was absorbed by it.

Larnian

The Irish Mesolithic, which is said to have developed independently of Tardenoisian and Baltic influences, lacks microlithic implements, but contains a heavy element of picks, choppers, and core and flake

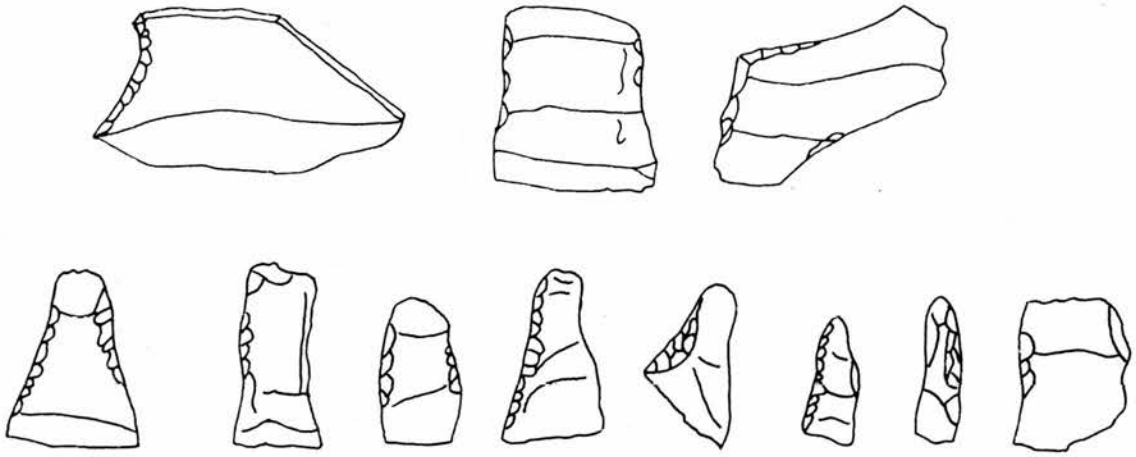
axes and adzes. Although bone-work undoubtedly was important in the technology, all of it has long since disintegrated. One of the most significant trends in Larnian was the shift from a forest-fenland environment to a coastal one, paralleling the Baltic transformation.

Maglemose is characterized by a vast east-west spread. Similar cultures are found from western Scotland to the Soviet Union, and, as part of the Circumpolar Stone Age, many Maglemose-type traits reached eastern North America. In view of this, it seems reasonable to expect some unity with the Continental Mesolithic. The apparent lack of similarity must be due largely to the sparsity of information available outside Scandinavia and the British Isles.

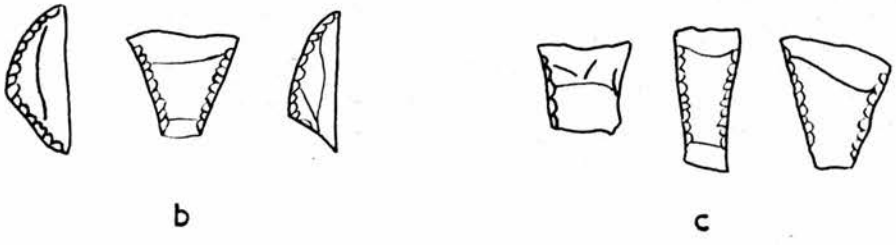
Some continuity between the primary Mesolithic is indicated by the presence of microliths and, when preserved, comparable bone and antler forms. Typological variations are acknowledged, but this variation hardly deserves recognition as a major facet of the total economic pattern. The significant thing is that microlithic industries are found all over Europe as a basic technological feature of the Mesolithic.

In the later Mesolithic cultures we find an emphasis upon the petit tranchet, usually defined as a trapeze or derivation thereof.

Fig. 7. Mesolithic transverse arrowheads.
a. Ordrup Naes (Denmark)
b. Maglemose
c. Ertebølle
d. Tardenoisian
e. Spanish Azilian
f. Tagus (Portugal)
g. Sauveterrian (Switzerland)
(After Becker, 1939; Clark, 1936; Mazalek, 1954; Obermaier, 1924; Bandi, 1956.)



a



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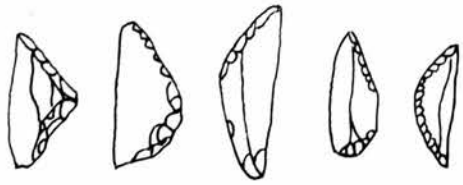

g

Fig. 7

However, the transverse arrowhead is not limited to trapezes but includes triangles and crescents as well (Fig. 7). On this basis we may recognize this implement type in most microlithic assemblages, while the trapezoidal forms are more characteristic of late Mesolithic. It might be suggested that some of the triangular and crescentic Sauveterrian microliths (Fig. 7: g) provide reasonable prototypes for "traditional" transverse points.

Perhaps more important economically was the late Mesolithic shift from inland to coastal settlement, which may be observed not only in the Baltic but in Ireland, Scotland, France, Spain, and Portugal. The French sites, Téviec and Hoëdic, have been described as pre-Neolithic but primarily on the basis of cultural content, i.e., there were no Neolithic artifacts or domestic animals. Both these sites and the Tagus shell-mounds in Portugal contained trapezoidal transverse arrowheads, which are not early Mesolithic types.

The faunal evidence clearly reflects the economic results of the change in settlement pattern. Midden-accumulation leaves no doubt as to the emphasis upon shell-fish gathering, and the presence of deep-sea fish and sea-mammals presumably indicates alterations in hunting and fishing techniques as well as increased navigational activities. While land mammals were not ignored, their remains are proportionately small in number.

The presence or absence of wood-working tools is almost certainly correlated with environment and possibly even with such

factors as seasonal occupations and settlement changes. In any case, there is no reason to discredit the use of heavy tools in Tardenoisian, as Barrière (1955) has recently stressed, or perhaps even in Azilian (Peters, 1934). We also find them in England (Horsham), Scotland (Obanian), and Ireland (Larnian), often without the apparent benefit of direct Baltic influence.

We can not dispose of the fact that regional variations in economy and technology must be given full consideration, but it seems unnecessary that we become ensnared in a typological maze. Rather we should recognize Sauveterrian, Tardenoisian, Azilian, and other Mesolithic cultures as local or chronological variants within a Mesolithic continuum to which Maglemose and Ertebølle also belong.

Further evidence of this is offered by post-Danubian I Neolithic cultures, from almost all of which are recovered Tardenoisian blade and microlithic flint-work (Mazalek, 1954) as well as Baltic-type bone and antler tools. For example, from Central European sites like Jordansmühl and Rössen come socketed antler axes of the same type found in Ertebølle. The difficulty is that the Mesolithic predecessors of these bone and antler artifacts are unknown due to the lack of preservation, so we must infer that the local Mesolithic types were the same.

PART II

N E O L I T H I C

CHAPTER VII

CLASSIFICATION OF THE NEOLITHIC CULTURES

In Northwestern Europe, the Neolithic cultures can be grouped in four categories: Primary Neolithic cultures and their derivatives, Secondary Neolithic cultures, Sub-Neolithic cultures, and an intrusive group of cultures which appeared late in the Neolithic sequence and were not basically continuations of earlier patterns in this part of Europe.

Primary Neolithic Cultures

This group includes the Danubian, Funnel Beaker, and Western Neolithic cultures, each of which was a widespread Neolithic pattern beginning early in the period. Local subdivisions of these three cultures were primarily further developments of their respective stems, with certain additions as a result of contact with one another, absorption of Mesolithic people, and diffusion of new traits from the Mediterranean. Danubian, Funnel Beaker, and Western Neolithic cultures lost much of their homogeneity because of such local differences arising during the course of time, but the basic patterns can be followed throughout most of the Neolithic period.

Secondary Neolithic Cultures

The Secondary Neolithic cultures developed as a result of the acculturation of Mesolithic populations by Primary Neolithic cultures.

These new Neolithic converts retained a decidedly Mesolithic outlook even though their economies included many Neolithic pursuits. Secondary Neolithic cultures are united as a whole by a number of traits which can be traced back to the Mesolithic, and many of these traits continued to flourish in the Circumpolar Stone Age up to the historic period.

Professor Piggott has succeeded in identifying several British Secondary Neolithic cultures, and on the Continent it is possible to recognize similar economies, such as Michelsberg (formerly assigned to the Western Neolithic), Seine-Oise-Marne and Fort-Harrouard in France, and Horgen (Swiss "Middle Neolithic"). While none of these is related to another, they share the following features: emphasis upon hunting and fishing, Mesolithic implement types, degenerate ceramics, and a relatively late appearance. In the case of Michelsberg, Fort-Harrouard, Seine-Oise-Marne, and some of the British groups, we find a "Campignian" tradition associated with flint-axe industries.

Sub-Neolithic Cultures

Under the designation "Sub-Neolithic" are included Scandinavian Pit-Ware and the Circumpolar Stone Age as a whole. These cultures are classified as Sub-Neolithic because the Neolithic content was subordinate to that of Mesolithic origin. Farming and herding were of little or no significance in comparison with hunting and fishing, largely as a result of environment. In the extreme north agriculture

could not have been carried on, but in regions further south the choice must have been possible. In a sense, the preference for hunting and fishing by Pit-Ware people duplicates the economic pattern on the Pacific coast of North America, where the fruits of such activities were sufficient to ensure a fairly high standard of living.

From an archaeological standpoint, the most significant contribution from the Neolithic was the introduction of ceramics. As in the Secondary Neolithic, pottery was crude and simple. Many other elements were held in common by the Secondary Neolithic and Sub-Neolithic cultures, and the two groups must be considered as products of the same type of cultural development. The essential difference between them lay in the economic emphasis upon agriculture, which was an integral part of the Secondary Neolithic and of very little importance in the Sub-Neolithic cultures.

Intrusive Warrior Cultures

Late in the Neolithic the Cord-Ware, Globular Amphorae, and Bell Beaker cultures appeared on the scene. All were warriors and traders who ranged over Europe and may be traced by their distinctive pottery and weapons. In their wanderings, these people mixed with other groups and often obtained political control, the result being a certain amount of cultural hybridization. Burials, for example, were often placed in megalithic tombs belonging to local Primary or Secondary Neolithic cultures—which appears to illustrate

political domination. Globular Amphorae culture in particular contains a mixture of traits absorbed from Mesolithic and Neolithic cultures of Central Europe.

Although these cultures did not have a common origin or even many common technological traits, they did come into contact with one another and all made contributions to the Early Bronze Age. Cord-Ware and Globular Amphorae contact took place in Central Europe, and further west Cord-Ware and Bell Beaker groups were closely associated. The first Beaker people in Britain were a mixed Bell Beaker-Cord-Ware group.

The Scandinavian Late Neolithic must be treated separately, since it was extremely late and to a large extent was a reflection of the Early Bronze Age already established further south.

CHAPTER VIII

PRIMARY NEOLITHIC

Under this heading falls the majority of European Neolithic cultures north of the Danube. The three main culture-areas, Danubian, Western Neolithic, and Funnel Beaker, are distinguished primarily on the basis of origin, distribution, and ceramic forms. Each may be further sub-divided on approximately the same grounds.

To the Danubians must go priority for earliest settlement north of the Balkans, since the Linearbandkeramik (Danubian I) people were clearly the first Neolithic pioneers. Not before the final stages of Danubian I did other Neolithic cultures appear in this area. As their name indicates, these farmers entered Central Europe from the Balkans via the Danube and its tributaries, and in time reached the North European plain and the Rhine. They appear never to have penetrated Scandinavia and made only slight inroads beyond the Rhine.

Those cultures which have been given the name "Western Neolithic" entered Western Europe by way of southern France, spreading from there into the Swiss and north Italian lake country, northern France, and across the Channel to England. The pottery of these groups suggests a western Mediterranean source, for similar ware is known from Sicily, North Africa, and Spain.

The origin of the Funnel Beaker cultures is an even greater mystery. As C. J. Becker has said, an origin outside northern

Europe is supported more than anything else by the failure to illustrate indigenous evolution or derivation from Danubian or Western Neolithic cultures. In Central Europe Danubian and Funnel Beaker culture-areas overlap to a point where it is sometimes difficult to classify local cultures in one or the other.

Danubian

Early Danubian (Danubian I)

These first Neolithic colonists, whose pottery also has given them the names Spiral-Meander and Linearbandkeramik, practiced a form of shifting agriculture on the fertile loess. None of their sites was inhabited more than a few years, since when the soil was exhausted they merely moved on to a new location. Several types of grain and vegetables were raised, as well as small numbers of cattle, swine, and sheep, but hunting and gathering seem to have been of no importance.

Ceramics found in the settlements always include a coarse and rarely decorated ware in association with finely decorated ceramics. The forms consist of large storage vessels (sometimes up to one meter in height), bowls (some of which are oval), hemispherical "basins" (Kümpfe), flasks, and occasional beakers. Childe (1951, 99) believes the Danubian pottery was modelled after gourd vessels, the likeness being increased by incised skeuomorphic zigzags representing the slings used for carrying such containers. Later appeared non-indigenous ware which was made up of such types as

footed beakers, ladles, pedestalled bowls, and angular (biconical) jars; all of these occur in Theiss, an eastern Danubian offshoot. The steep-walled beakers which appear in late Danubian and Rössen seem to have originated in Moravian Painted Ware (Sangmeister, 1950). It must be recognized that early Danubian forms held their ground in marginal areas while these new types replaced Danubian I elsewhere.

Ceramic ornamentation is typified by incised spirals and meanders, although linear motifs occur as well. In later Linearbandkeramik the designs often are filled with dots or short strokes as stroke-ornamentation becomes more and more prevalent.

The type implement of Danubian is the "shoe-last" celt, which might better be described as an adze (Buttler, 1938, 34). Some of the stone axes were perforated, and for this purpose hollow drills were used (Childe, 1953, 202). Discoid maceheads also are common throughout the area and could represent badges of status rather than weapons, which are otherwise rare. Among small flint tools are awls and scrapers, and triangular, transverse, and hollow-based points. Ornaments of Spondylus shell are found all over the Danubian culture-area.

The most informative Danubian settlement so far investigated is that of Köln-Lindenthal in western Germany (Buttler and Habery, 1936). The primary structures were a number of large "barns," in association with a couple dozen pits, described by Buttler as pit-dwellings. It is now clear that the actual dwellings were the so-called barns (Childe, 1951, 99). The whole site was surrounded by a trench and palisade. Buttler (1938, 21) assigns Köln-Lindenthal to late Danubian I.

West of the Rhine, a few signs of Danubian penetration may be recognized in Alsace and the Paris Basin, but the most significant extension west of the Rhineland is Belgian Omalian (Hamal-Nandrin, Servais, and Louis, 1936).

Omalian has long been recognized from a number of village sites concentrated in the Liége-Limbourg area. Of the dwellings themselves only irregular pit foundations remain, and little can be said concerning either house types or construction material.

The authors are convinced that the Omalians were not concerned with the flint-workings at sites such as Spiennes and Braives because the typical rough flint axes are totally absent in Omalian contexts. However, Bailloud and Boofzheim (1955, 42) recognize the plentiful Omalian pyramidal cores, prismatic blades, and crude "orange section" implements as types illustrating "contact with Campignian tradition," which itself implies flint-mining.

Virtually all Omalian implements are made on blades and include end-of-blade scrapers, awls, blades for composite sickles, saws (?), notched or truncated blades, arrowheads, and possibly burins. Many of the arrowheads are in the form of petit tranchets or derivatives. The crude flint implements which look like orange sections, as well as a number of the blade tools, were probably used for working wood and bone or antler. In polished stone there are unperforated celts of Danubian type, grindstones, grooved polishers, sandstone discs with hour-glass perforations (maceheads?), and fragments of other perforated implements (at least one of which resembles British Secondary Neolithic maceheads).

On only one site--Saint-Lambert in Liége--did conditions permit the preservation of bone and antler, and even here such remains were sparse. There was a four-tooth bone comb, an incomplete polished bone instrument which may have been a chisel, and an antler "macehead." Also at Saint-Lambert the following animals have been identified: cattle, pig, deer, and fish. Whether the first two were domesticated is not known. Grain imprints have been found on pottery.

Ceramics are plain or incised and occasionally decorated in relief. The forms are mostly Danubian hemispherical or globular types. Perforated or unperforated bosses or lugs occur on many of the vessels, but true handles are virtually absent. Vessels of finer texture are almost always decorated with punctate chevron and arc patterns, bands of curvilinear or linear incisions, meanders with cross-hatched filling, meanders and chevrons with punctate filling, circles or pits, punctate concentric squares, or other similar designs. A very few sherds have traces of white incrustation. Ornament in relief is ordinarily combined with incised decoration, except on vessels completely covered with relief patterns. Most of this type of decoration is in the form of bosses or an all-over "pineapple" effect of irregular depressions produced by repeatedly pushing a stamp of some kind deep into the soft clay (all decoration applied before firing). Four sherds from one Omalian site have faint fabric or basketry impressions. One vessel has two holes placed next to a crack for mending purposes, a typical Circumpolar trait.

The Omalian culture appears to represent the impact of early Danubian upon a Belgian hunting and fishing population, for under the Neolithic veneer there are numerous indications of a Mesolithic economy.

Although Danubian I persisted in some areas until a relatively late date, new developments were taking place as a result of Mesolithic and/or fresh Neolithic influences. One group of derivative cultures (Stichbandkeramik, Rössen, Hinkelstein) apparently arose through the adoption of Danubian economy and technology by indigenous Mesolithic inhabitants of Central Europe. Meanwhile, another group (Theiss-Jordansmühl-Lengyel and associated cultures) appeared in Central and Eastern Europe. Its origin seems to have been in the Hungarian region, which was now in its Copper Age (as shown by the frequent occurrence of copper trinkets in sites belonging to this second group). At some time during this period, the first Funnel Beaker cultures appeared in Northern and Central Europe.

Danubian Stroke-ornamented Wares

Stichbandkeramik

The development of stroke-ornamented ware (or Stichbandkeramik) probably took place in Bohemia, from whence it spread to Moravia and south, central, and east Germany (Childe, 1951, 106-7). Contemporary with late Danubian I and early Theiss, it was replaced eventually by Theiss in the east and Rössen in the west (Buttler, 1938, 67). Some signs of Stichbandkeramik are seen in northwest Poland (Jazdzewski, 1938) and as far south as Austria (Pittioni, 1954, 140-3).

Geometric patterns produced by separate, short strokes instead of continuous incisions constitute the primary ceramic deviation. Pot forms remained much the same. Transverse arrowheads suggest a greater emphasis on hunting than was previously the case, and a number of other Tardenoisian blade and microlithic types were shared with Rössen.

Hinkelstein

While late Linearbandkeramik prevailed upon the middle and lower Rhine, a Stichbandkeramik derivative known as Hinkelstein occupied the upper reaches of the river. Hinkelstein ware consists mostly of deep Danubian bowls which are richly decorated. Intrusive forms are footed beakers and "flowerpot" (steep-walled) beakers. Chevron bands and triangles characterize the ornamentation of the body, while below the rim are horizontal rows of furrowed strokes or lines. Transverse arrowheads and extended burials (Childe, 1929, 49-50) are suggestive of Mesolithic antecedents. Most of the sites are around Mainz and Wörms and represent the furthest westward extension of stroke-ornamented ware.

Rössen

This Neolithic culture of south and central Germany may be an off-shoot of Stroke-ornamented Ware (Engel, 1940), and probably represents the acculturation of some Mesolithic group under the influence of the latter (Childe, 1951, 107). A number of authors have called attention to its "Nordic" affinities, especially the use of deep-stroke decoration characteristic of the Funnel Beaker cultures.

It hardly seems necessary to refute once more the theory of its derivation from Northwest German Megalithic ceramics, which certainly did not precede Rössen (Buttler, 1938, 44; Engel, 1940, 80). It now seems certain that Rössen developed quite independently of the Funnel Beaker evolutionary scheme (Stroh, 1940, 117) and any common traits must be traced back to Rössen, not vice-versa. Rössen must have been in contact with at least the later phases of Stichbandkeramik and possibly even with late Linearbandkeramik (Buttler, 1938, 63). It continued during the Michelsberg-early Funnel Beaker development and represents the final "Danubian" of the west.

Niquet (1937) makes a division of Rössen ceramics based primarily upon the presence or absence of decoration and pot profiles. Among the decorated forms are storage vessels, footed bowls, "tubs" (Wannen), and "flowerpot" beakers. Globular pots and flasks occur either decorated or undecorated. The decorated vessels with rounded profile are older (Altrössen), having developed "not under the influence of either Danubian or Funnel Beaker culture." Altrössen is described as an indigenous Central German culture having relationships with many of the Neolithic cultures of the area, all of which hark back to the underlying Mesolithic basis (Ibid., 46).

The angular-profiled and more rarely decorated ceramics (Jungrössen) are admitted to have developed under Lengyel-Jordansmühl influence. Jungrössen is found primarily in south Germany. Engel (1940, 81) believes Altrössen and Jungrössen are based on assumptions which are too arbitrary and ignore stratigraphical considerations. He suggests

substituting "Central German" and "Southwest German" for the respective "early" and "late" designations.

Ceramic ornamentation is either deep-stroke or stamped and appears to imitate basketry. Both linear and curved patterns were used, triangles and zigzags being very common. Decoration of the inner rim was a Rössen specialty.

Tools closely resemble Danubian types, illustrating the Danubian affiliations of Rössen. Various types of perforated and unperforated stone axes were in use, including the familiar shoe-last celt. The flint industry is based on blades and includes knives, scrapers, medial and angle burins, truncated and notched blades, triangular points (some hollow-based), and transverse points. Pear-shaped mace-heads occasionally appear in graves.

Bone implements played no great role in Rössen technology. Most common are awls, a few of which are perforated. Chisel-like tools, bone daggers, broad scrapers or spatulae, and a few Jordans-mühl-type (socketed) antler axes make up the bulk of the remainder.

Typical of Rössen are marble arm-rings, which by their size must have been placed on the arm during childhood (as was done until recently on the Sahara). Necklaces were made of chalk, jet, marble, and shell beads. Perforated boars' tusks served as pendants, and "double buttons" of boar's tusk probably imitate amber buttons found in East Prussia, Sweden, and Denmark (Niquet, 1937, 36-7). Necklaces often include, besides the beads, stylized imitations of deer teeth in chalk. Deer teeth as well as boars' tusks were worn as pendants.

Grooved clay rings (Stroh, 1940, Tab. 26: 3, 5 - 7) occur with some frequency in southwest Germany. Their use is not clear; they may be imitations of central German marble armbands, but it is highly unlikely that they functioned as vase supports.

Both rectangular and irregular house foundations are attributed to Rössen. By this time the two room "megaron" house was replacing the Early Danubian rectangular long house (Childe, 1949b, 79). The association of Rössen with hilltop settlements—Glauberg in upper Hesse, Michelsberg near Untergrombach, Goldberg in Kr. Neresheim, Bürglebuck near Eiedböhringen, Hagschutz near Niedereggenen, etc.—is in line with the relative increase of weapons. By this time, there must have been a considerable increase in competition for land.

Rössen burials are single inhumations in flat graves; the few known cremations are attributed to the "Gatersleben" sub-group, whose pottery is related to that at Jordansmühl (Fischer, 1956, 40). Although flexed burials are typical, a number of extended ones have been found. The site of Rössen itself provides us with about three-quarters of the Rössen graves known in Germany.

While these cultures just described remained essentially Danubian, there are strong suggestions of a Mesolithic increment. Extended burial, transverse arrowheads, ceramic patterns copying basketry, blade tools, ornaments of deer teeth and boars' tusks, and an increased emphasis upon the chase indicate a Mesolithic sub-stratum of some sort. Although the faunal evidence remains

associated with the Stroke-ornamented Ware cultures have not been described, Childe (1929, 54) states that wild animals predominate over domestic in all Rössen Rhineland settlements. Once the Danubians had become established local hunters and gatherers must have adopted Danubian culture or mixed with the Danubians, although certain elements of the old tradition were retained. As yet, it is impossible to place these people precisely in time and space. Some of the flint types might have developed from a Tardenoisian background. Furthermore, long bone "daggers" and extended burials with the lower limbs flexed to one side assigned to Rössen (Niquet, 1937) were found at the Tardenoisian station of Téviec on the Breton coast (Péquart, Boule, and Vallois, 1937).

Eastern Danubian Cultures

During the time of Danubian I survivals and the rise of the stroke-ornamented wares in Central Europe, another group of Danubian variants appeared in the southeast. Originating in the region of Hungary, it spread north and west where it is represented by several related sub-groups. In Hungary is the Theiss culture, which is the name often given this whole series. In east Germany are Ottitz and Jordansmühl and in south Germany Münchshöfen and Aichbühl. Moravian Painted Ware occurs from Austria through Moravia and Bohemia to Silesia and Poland, and the "Brzesc Kujawski" phase is another local type in Poland. Pottery is ordinarily flat-based, in contrast to Linearbandkeramik. One of the leading forms is the pedestalled bowl; there are also high storage vessels, beakers, bowls, handled

pitchers, angular vases, and ladles. Metal was known, but it was not yet used for tools. In general, the material equipment is Danubian in character. Since considerable confusion may arise as a result of inconsistent terminology, for the present purposes it might be better to speak of this complex in its entirety as "Eastern Danubian" (rather than Theiss, Lengyel-Jordansmühl, Danubian II - III, etc.). Although some of the sub-groups penetrated south and central Germany, their roots are obviously in the eastern part of Central Europe. Moreover, all of them evolved from a common source ultimately, and were essentially Danubian.

Moravian Painted Ware

Stocký (1929) includes this under the term "Lengyel," after the Hungarian hilltop site of the same name. Moravian Painted Ware, as it is more commonly called, corresponds to Childe's Danubian II and is represented in the area between Silesia and Upper Austria. It is often difficult to separate Painted Ware from the very similar Jordansmühl. Moravian Painted Ware appears to follow late Danubian I immediately, being contemporary in its earliest phase with late stroke-ornamented ware and in its later stages with the earliest manifestations of Funnel Beaker culture, at least in the Moravian area (Milojčić, 1949, 96).

Ceramic forms include large storage vessels, beakers with angular or globular bodies, flask-like vessels, biconical vases, and bowls of a variety of shapes, including the pedestalled form. All these types characteristically have ornamental warts on them.

Unique are cubical clay blocks with one or more holes in them, which may represent an attempt to reproduce Early Minoan stone vases (Childe, 1951, 103).

Decoration normally covers the whole vessel surface and is engraved and painted. Painting is not limited to the outside but on the bowls especially occurs on the inside. Patterns are chiefly spirals and meanders, although bands of parallel lines also appear. There is a tendency for the spiral and simple linear designs to be replaced by geometric patterns and at the same time for color to become subservient to pattern (Pittioni, 1954, 152-4). The early phase is typified by tri-chrome ware (black, red, yellow, white, brown) and the later phase by the use of red and white paints.

Also made of clay were simple and rather crude human (and a few animal) figurines, socketed ladles, pintaderas (clay stamps), and spinning whorls.

Stone axes are either pointed-butted or flat, trapezoidal types. Tardenoisian blade and microlithic flint tools (Fig. 9: a) suggest Mesolithic influences. Bone awls and chisels and antler picks also are attributed to Painted Ware, and as in other later Danubian cultures, "polishers" of ox bone were in use (Neustupný, 1952).

Little is known of house types. Eggendorf am Wald and some other sites in Austria contain circular hut foundations (Pittioni, 1954, 158). From Stĥelice, Moravia, is a house model with five posts on each long side and a gabled roof (Schránil, 1928, Tab. VI: 6),

and a similar fragment was found in Austria (Pittioni, 1954, Fig. 106).

Burial practices are little known. A few pit burials with flexed skeletons have been found.

Closely related to the Moravian Painted Ware culture is the fortified settlement of Lengyel in Hungary (Wosinsky, 1888-90). The ceramic forms are much the same, but handles are much more in evidence. Cordoned vessels with fingertip impressions seem rather common (Ibid., Tab. VII: 12-16). Wosinsky also illustrates a fragment of a "sieve," a bowl-like vessel with a base full of small perforations (Tab. XXXIII: 251). The heavy stone industry consists of perforated and unperforated axes and chisels, including hollow-edged chisels (Fig. 8: f), and there is also a blade industry. Bone and antler forms are antler "lanceheads" (Fig. 8: c, j, k), bone awls (Fig. 8: i, l), bone and shell armbands (Fig. 8: b), antler sleeves (Fig. 9: f), and bone spatulae (Fig. 8: m). Split boars' tusks (Fig. 8: d) and perforated teeth (Fig. 8: e) are represented also. Ornaments of copper and bronze were in use, although the rest of the material shows we are dealing with a Neolithic economy.

Fig. 8. Eastern Danubian tools and ornaments.
a. stone axe
b. bone armband
c, j, k. antler "lanceheads"
d. boar's tusk lamina
e. perforated animal teeth
f. stone gouge
g, h, i, l. bone awls
m. bone spatula
(g. and h. from Jordansmühl; remainder from Lengyel. After Wosinsky, 1888-90; Seger, 1906.)

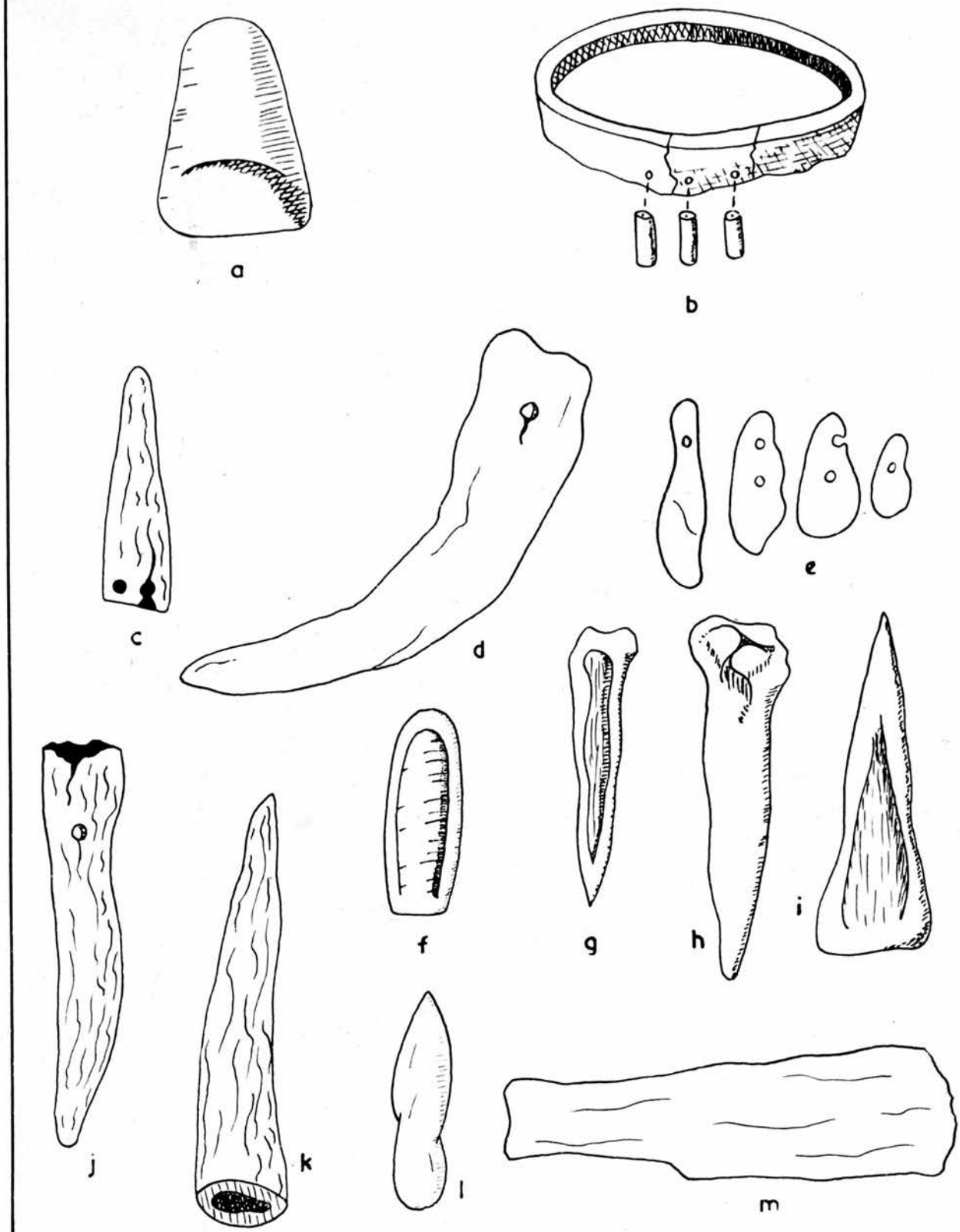

Fig. 8

Jordansmühl

Jordansmühl is a slightly later (Danubian III) development within the Eastern Danubian sphere. The Ottitz group is perhaps somewhat older and like Jordansmühl is affiliated with Moravian Painted Ware, but is not nearly so well known as Jordansmühl.

Although the Jordansmühl type site is a cemetery in Silesia, the culture itself extends into central Germany and apparently Poland and Bohemia as well. The basic pot forms are the same as those of Moravian Painted Ware, from which Jordansmühl may have been derived (Schranil, 1928, 55). Jordansmühl pottery, however, does not have painted decoration, and some types, like the well made small pitchers, are foreign to Painted Ware. Decoration is exclusively incised and occurs mostly on the single- and double-handled "pitchers." Patterns include bands of several simple lines, furroved strokes, meanders, and zigzags.

Fig. 9. Eastern Danubian flint and antler implements.

a. Moravian Painted Ware
b. Jordansmühl
c. Mondsee
d. Münchshöfen
e, j. Jordansmühl
f. Lengyel
g. Brzesc Kujawski
h. Dimini
i. Ertebølle

(After: Mazalek, 1954; Pittioni, 1954; Seger, 1906; Wosinski, 1880-90; Childe, 1950; Clark, 1936.)

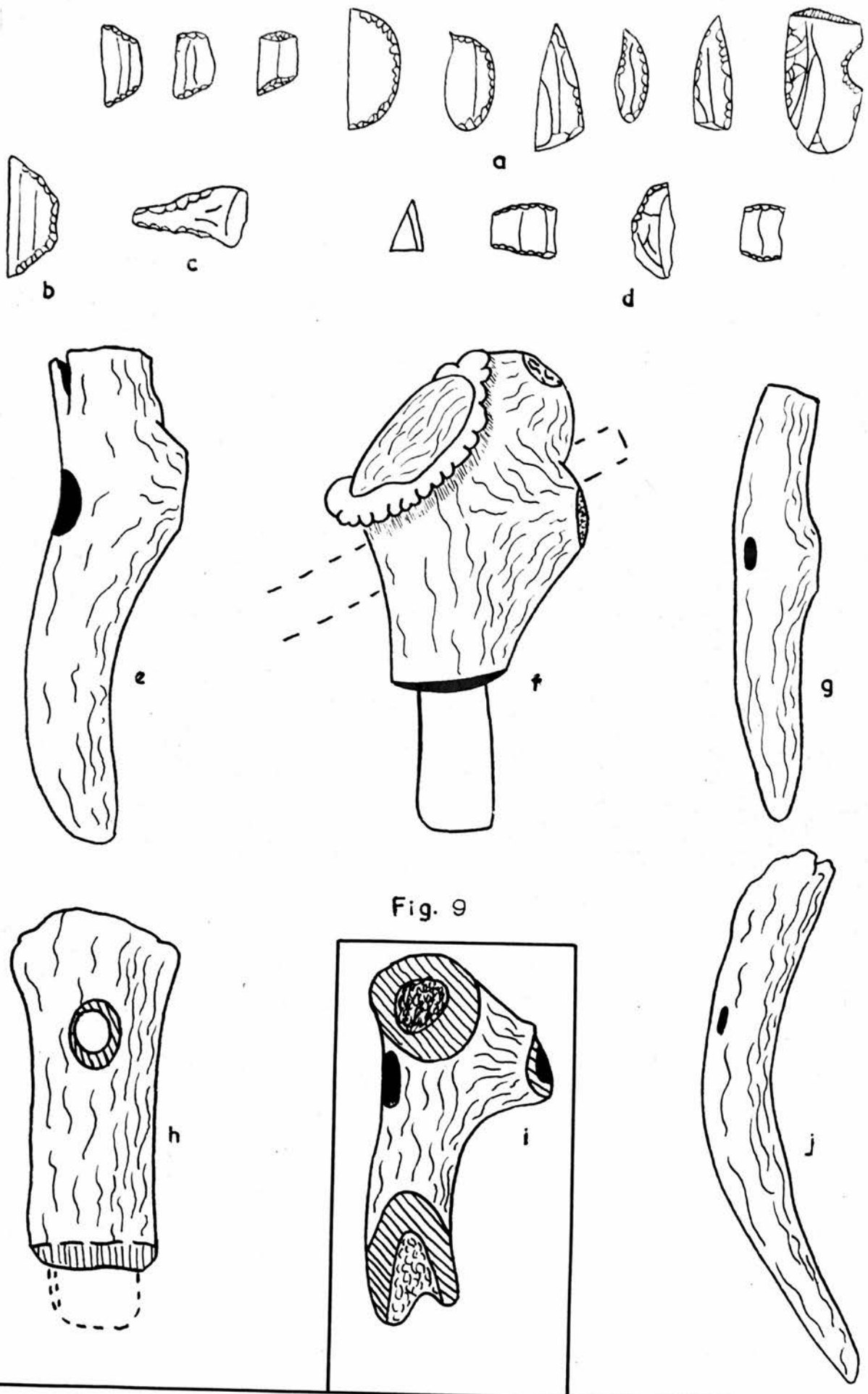

Fig. 9

The Jordansmühl cemetery (Seger, 1906; 1916) lies about 25 kilometers southwest of Breslau (now Wroclaw) and is made up of a large number of pits and graves. In some of the pits, which must have been dwelling foundations, were remains of wickerwork and lime. The dead were not placed in a separate cemetery, but in the immediate vicinity of the houses. Flexed burials were the rule, but a few were extended. Besides the grave goods most burials contained a few sherds and animal bones left from a funeral feast.

In 1902, two animal graves were discovered in the course of the work. The first contained a young cow at one end and a sheep at the other, both carefully laid out in the same order. The other grave revealed the skeleton of a wild ox (Bos primigenius) whose horns had been broken off for trophies. In addition to the ox, there were a couple of dog skulls, a child's skull, and on the ox's skull a complete dog skeleton. Under the primary pit was a second pit bounded by a stone perimeter and filled with animal bones.

Animal burials with human remains as well as separate animal burials are reported for a number of Central European Neolithic sites (Gandert, 1953). Cattle are most often found, and the ritual burials must reflect the cattle graves which included ceramic grave goods; and near Potsdam the same phenomenon occurred. In Austrian Burgenland was the grave of a woman and child which also contained a horse and the skull of another, a mare and her foal, a goat and kid, a cow and calf, and a sheep and lamb (Pittioni, 1954, 246;

Fig. 172). According to Gandert at least 25 cattle and more than 20 cattle skulls have been found under such conditions in Central Europe.

Fauna on the site consisted of cattle (Bos primigenius-Rasse and Bos taurus), sheep, swine, dog, wild boar, wild ox (Bos primigenius Boj.), aurochs, deer, and roe-deer, but Seger does not give the proportions of wild and domestic animals.

The economy was wholly Neolithic; only ornaments were made of metal. Small tools like knives, scrapers, saws, borers, and transverse arrowheads were of flint. Most of the trimming was limited to that which was necessary, i.e., there was no attempt to make such implements pleasing to the eye. For axes and chisels, slate-like stone or serpentine was utilized. The axes included unperforated types, paralleling Danubian celts, and perforated axes and adzes. Out of bone were produced awls (Fig. 8: g, h), needles, daggers, handles, and pit-decorated pendants or amulets. Split boars' tusks made useful tools with little effort expended, and worked antler, including picks (Fig. 9: j) and axes, was frequently found. The axes (Fig. 9: e) were made on the same principle as the Ertebølle type (Fig. 9: i) with the perforation through a tine to provide a socket. The copper was all cold-forged and made into "spectacle spirals," single spirals, spiral armbands, pendants with one rolled end, etc. Metal tools were completely absent.

The Jordansmühl pits contained, in addition to the fine bowls and pitchers of the graves, numbers of crude cooking vessels. These

have lugs or handles and decoration in the form of notching, strokes, or finger impressions. Part of a sieve also appeared at Jordansmühl (Seger, 1906, Tab. X: 19).

Seger especially mentions one grave surrounded by a rectangular stone peristalith, which he thought resembled Bottom Graves of the Jutland Single-Grave culture. The grave contained a woman's body with several pots and three amber rings. These rings are all grooved on the outside and recall the Doppelknöpfe of Northern and Central Europe. Other affinities with the North are to be seen in the ceramics, e.g. the handled pitchers, absent in Bandkeramik, appear in Megalithic pottery. At Jordansmühl there were also funnel beakers (Ibid., Tab. XII: 1) and collared flasks (Tab. XII: 6, 10; Fig. 27); one of the collared flasks was in the grave just mentioned. At other Jordansmühl sites thin- and thick-butted flint axes, as well as transitional forms, have come to light.

Brzesc Kujawski

Another Danubian-type complex, from Brzesc Kujawski on the middle Vistula in northwest Poland, has been described by Jazdzewski (1938). On the two sites investigated were uncovered foundation trenches of trapezoidal houses, and graves were strewn about among these, 29 of them in one site and six in the other. In the foundation trenches were signs of burned and unburned clay mortar. Over the huts lay a mixed cultural stratum in which were found sherds of a local Eastern Danubian culture, which Jazdzewski calls "Brzesc Kujawski."

The complete correspondence of grave and settlement inventories showed the two were contemporary. Most burials were flexed and placed head southward. A few bodies were extended on their backs, and a number of skeletons were dug out of refuse pits. With male interments were socketed antler axes (Fig. 9: g), stone chisels, bone plates, hollow-scrapers of boar's tusk, hand mills, necklaces with bone discs and copper double-spirals, and quantities of small flint artifacts. Women's graves contained richly-decorated bone armbands, copper beads, pottery, necklaces of bored teeth, amber beads, and occasionally some flint objects. In graves of both sexes were copper ornaments, necklaces, metal forearm bands, and bone awls. The graves themselves were roughly rectangular and had no stone cover.

The embossed copper discs from Brzesc Kujawski are exactly like one from Salten, Jutland, and serve to align Brzesc Kujawski with Becker's Early Neolithic C of Denmark. Since other copper-work recalls ornaments from Jordansmühl, the latter is also brought into line with Brzesc Kujawski and Scandinavian Period C. This date also was supported by the appearance of some sherds of early Eastern Funnel Beaker type in refuse pits and a foundation trench.

Two ceramic types were noted at Brzesc Kujawski. The first was a late form of Danubian I ware, which occurred only on one settlement. The other was an Eastern Danubian ware, the primary forms of which were wide-mouthed pots with slightly projecting rims, "tureens," flasks with double-conical bodies and cylindrical necks, globular amphorae with short necks and two handles, pail-shaped vessels,

and spoons. Some vessels with feet were found, and in a few cases the feet were either hollow or in the shape of animal paws. This "Brzesc Kujawski ware" is marked by an almost complete absence of decoration, and most of that which does occur is limited to rims and handles. Occasional chevron bands or diagonal line patterns are close to stroke-ornament.

Decoration on bone objects was geometrical. The bone armbands were made of broad ribs perforated at the ends so they could be pulled together with laces. Copper armbands were made either of twisted strips or tubular beads, and in both cemeteries were necklaces of copper beads, river shell-fish beads, Spondylus pendants, bossed copper plates, copper double-spirals, amber beads and pendants, and calcite beads. Peculiar to Brzesc Kujawski were forehead and cheek pieces of copper beads, sometimes flanked on the ends by stone beads. Whether these were fastened to a head covering or just held in place by a band running over the crown is not known. "Girdles" of bone cylinders or fish vertebrae alternating with clay or shell-fish beads were part of feminine attire.

Copper from the settlements was in the form of a flat chisel, an awl, rectangular pendants rolled at one end, triangular pendants with bosses around the edges, a spiral cylinder, and various rods of four-sided cross-section. All the copper objects had been cold-hammered and possessed a high copper content. The "spectacle spirals" may be copies of gold ones such as those found at Troy II (Childe, 1951, 115).

So far there have been no authenticated early Linearbandkeramik sites in Poland. One grave at Brzesc Kujawski appeared to have Stichbandkeramik affinities, and other such graves are known. The Eastern Danubian group is well represented in Poland, especially by the Moravian Painted Ware sub-group in central and southeast Poland. Baden, a post-Jordansmühl culture, is also represented. Jazdzewski's "Brzesc Kujawski" originally appeared only at Brzesc Kujawski, although at least one other site has since appeared (Maciejewski, et al., 1954).

Almost one-half the Danubian (of all groups) graves in Poland are from Brzesc Kujawski, which illustrates the importance of this site for our knowledge of Polish early Neolithic cultures. The most common feature of all these graves is the flexed, lateral position of the bodies. Exceptional were a few bodies placed on their backs with the legs flexed, as occurred in Rössen. Graves scattered throughout the settlements, rather than in separate cemeteries, is typical of most Danubian sites.

The Brzesc Kujawski culture is most closely related to Jordansmühl and Moravian Painted Ware, and somewhat less to Stroke-ornamented Ware (Jazdzewski, 1938, 98). The bone armbands, long bone plates, boar's tusk scrapers, and copper ornaments are reminiscent of Jordansmühl, but pedestalled bowls were entirely lacking at Brzesc Kujawski.

Münchshöfen

This group is found in Bavaria and north central Austria. Two components appear in the pottery: a clear genetic relationship with

Moravian Painted Ware in form and at least some affinities to stroke-ornamented ware in decoration (Pittioni, 1954, 165). To the former belong pedestalled bowls, flasks, broad conical bowls, conical beakers, and high conical vessels with two small handles. Stichbandkeramik influence lies in bands and triangles executed with punctate impressions. Notched rims are typical of Münchshöfen (Childe, 1929, 86).

According to Pittioni, it is probable that most of the greenstone implements of Danubian type in the Upper Austrian-Salzburg area belong to Münchshöfen. Geometric microliths are assigned to this culture, and transverse arrowheads were used (Fig. 9: d).

Aichbühl

The moor-village of Aichbühl appears to be at least partially related to the cultures we have been discussing. Childe refers to it as a Danubian II culture with a pile-dwelling complex. The settlement is on the Federsee in Württemberg and consists of a number of two-roomed, rectangular houses built on log platforms.

The pottery is a polished black ware that corresponds in its forms to ceramics from Jordansmühl, Rössen, and Münchshöfen (Ibid., 166). Buttler (1938, 42) thinks Aichbühl a mixture of the Eastern Danubian types and Rössen. Childe (1951, 286) sees a Western component in some technological details and in the economy as a whole.

Baden

Because of the wide use of channeled decoration, Stocký (1929, 115) calls this the "Channeled Ware culture." Baden falls under the

designation "Nordic" according to a number of authors (Schránil, 1928; Stocký, 1929; Pittioni, 1954) because of certain similarities with the North. Centered in Austria and Bohemia, Baden sites are often on fortified hilltops. Among other animals, these herders possessed horses (Childe, 1951, 112). Baden, along with Jordansmühl, falls under Danubian III in Childe's Danubian sequence.

Ceramic forms are cups with high, strap handles, squat pitchers with strap handles, double conical bowls, amphorae-like vessels (Hängegefässe), Pfahlbau storage vessels with fingertip impressions under the rim, and a few collared flasks. On the amphorae there are often subcutaneous handles. Decoration is incised or applied, as well as channeled.

The tool inventory is made up of trapeze-shaped, unperforated axes, spheroid maceheads, triangular arrowheads (no transverse points), and blade tools. Copper was used but not for tools or weapons.

Channeled decoration and ribbon handles seem to be new developments from the southeast (Childe, 1951, 113), and the storage vessels parallel Michelsberg-Cortaillod types. Some ceramics resembling Funnel Beaker types suggest a relationship with Northern Europe, but actual correspondences are negligible. Essentially, Baden represents a continuation of Danubian technology.

Altheim-Mondsee

In Bavaria and Upper Austria are a number of related groups, e.g. Altheim, Mondsee, Laibach, which though primarily Danubian also show a few Western and "Nordic" traits. Round-bellied cups or pitchers

with handles, double-conical bowls, crude storage vessels, and high amphorae are common. Deep-stroke ornamentation is typical and often incrusted. There are also figurines of animals and humans, and in Austrian Mondsee clay ladles and "smelting bowls" were used for manufacturing metal implements.

Stone tools include unperforated axes, polygonal battleaxes, maceheads, single-piece sickles of the Scandinavian Passage Grave type, triangular arrowheads, blades, scrapers, and long transverse points (Fig. 9: c). The copper implements—axes, daggers, awls, sickle blades—support a late date for these cultures. From underwater lake sites a large amount of organic material has been recovered: antler sleeves and picks, bone awls and spatulae, pendants of bear, pig, and sheep teeth, wooden hafts, cord, and food products (grain and apples).

In addition to lake dwellings, there are elevated settlements, as at Altheim. The lake sites are closely related to those of Switzerland.

The Altheim culture, first defined by Reinecke (1924), has a flint and stone industry charcterized by hammer-axes, maceheads, trapeze-shaped axes, pointed-butted axes, hollow-based arrowheads, and large single-piece sickles. Small flint types are blades, knives, scrapers, and awls. Bone and antler were widely used, but the axes, sleeves, awls, chisels, and points are not characteristic of Altheim alone. A few copper tools and ornaments were in use.

The flat-based pottery is ordinarily of coarse clay and undecorated. When it occurs, decoration is in the form of finger-tip impressions. Less often plastic ornamentation appears and still more rarely

incised lines. Some of the ceramic forms closely resemble flat-bottomed, straight-sided Horgen vessels of the Swiss Middle Neolithic.

The correspondences with Horgen are strengthened by the Altheim houses at Goldberg in Württemberg (Bersu, 1937), which are the same type of square, one room dwellings as are found in Horgen settlements. At Goldberg, Altheim is superimposed upon Michelsberg, as Horgen is in Switzerland. The single-piece sickles, which are perhaps the most characteristic implement form, are cited by Piggott (1954b, 285) as typical Secondary Neolithic flint types in Britain. Altheim seems to represent a phenomenon on the western end of the Danube very like Horgen further south, which is a Secondary Neolithic culture.

The Eastern Danubian cultures as a group are derived from three primary sources, the original Danubian (Linearbandkeramik) background, contributions from acculturated Mesolithic inhabitants of the various local regions, and fresh Neolithic and Bronze Age influences from the southeast. In some areas, such as Poland and Bavaria, a certain amount of Stichbandkeramik influence is discernible, and in other cases Western and Funnel Beaker elements played a limited role.

Like the early Danubian settlements, those of the Eastern group were relatively temporary, although fortification was not unusual. Some of the ceramic forms were merely variations on the Bandkeramik theme; others were totally new. Most of the tool inventory---shoe-last adzes, maceheads, perforated hammer-axes---

retained its Danubian character. Spirals and meanders still appeared as decorative motifs, if far less frequently. Burials, as in Early Danubian, often were scattered about in settlement areas and the bodies almost always contracted. The economy was predominantly Danubian, strange traits being of secondary importance.

Obviously, some indigenous hunters and gatherers were absorbed by these people, for in contrast to Early Danubian there is a visible Mesolithic undercurrent. Blade and microlithic industries are commonly associated with the Eastern Danubian groups, some of which also used transverse arrowheads. The bone and antler industry includes bone awls and chisels, antler axes and picks, antler sleeves, bone ornaments, and boar's tusk laminae. Amber ornaments were discovered at Jordansmühl and Brzesc Kujawski. Pitted ornament (as at Jordansmühl) on bone is typical of Maglemose, and the evidence of funeral feasts or ritual deposits at Jordansmühl is paralleled at Téviec (Péquart, 1929). While the changes from incised to punctate decoration and from curvilinear to linear patterns in the Stroke-ornamented Ware cultures is what one would expect in the case of Mesolithic people adopting ceramic techniques, the Eastern Danubian pottery has the appearance of a continued elaboration on the older Danubian foundation. In spite of Mesolithic influences, the Eastern Danubian is primarily an evolved Danubian group rather than a Mesolithic group acculturated by contact with Danubian farmers.

New ceramic forms, such as pedestalled bowls, socketed ladles, biconical jars, perforated clay blocks, and two-handled pitchers or

tankards, joined the old types of vessels. The use of copper and bronze for ornaments in most of the Eastern Danubian sub-groups signifies the first appearance of metal in this area, but tools were still of stone and organic materials. These new features can not be explained purely as a matter of local cultural evolution; many of them must be interpreted as the result of contact with the Aegean, and some suggest direct contact (Childe, 1929, 91). The two-handled pitchers of Jordansmühl have metal prototypes in the Mediterranean, and the pedestalled bowls are a very ancient form in the same area which eventually diffused to the Baltic (Schwabedissen, 1953). The cubical clay blocks seem to be copies of Minoan stone vases. Zoomorphic and anthropomorphic motifs in the potter's art suggest influence from the south, and clay stamps must be imitations of Near Eastern stamp seals, even if they may not have been used for the same purpose. The use of copper and bronze was also derived from the Mediterranean; the double spirals of Jordansmühl and Brzesc Kujawski in particular are duplicated at Troy and elsewhere in the Near East.

Western Neolithic

Chassey

Until recently, no comprehensive study of the French Neolithic had ever appeared, but Professor Piggott's analysis[1] has done much

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1. L'Anthropologie 57, 58 (1953, 1954).

toward enabling us to see the development and relationships of the French Neolithic as a whole within its Western European setting.

In France, three early Neolithic traditions may be identified. The first, and least important, is a western extension of the Danubian culture-area. The second group is characterized by the use of "impressed" or "cardial" ware, and since it is essentially of Mediterranean origin and affinities we need not discuss it further here. The third tradition falls within the Western Neolithic complex and is generally known as Chassey.

First established in the south of France, Chassey was originally a Neolithic culture, but before the end of its development metal was introduced along the Mediterranean coast. With the beginning of the Metal Age are associated collective burial in chambered tombs, bell beakers, and pottery with incised or channeled decoration. The principal centers of this mixed tradition are Peu-Richard in Charente, Conguel in Brittany, and Fontbouisse in the south.

Meanwhile, Chassey spread north, one branch entering eastern France and Switzerland and another coming into contact with indigenous hunters and gatherers in northern France. The impact of Chassey upon the non-agricultural inhabitants of the north resulted in the formation of Secondary Neolithic cultures like Seine-Oise-Marne (SOM) and the late manifestations of Chassey, as at Fort-Harrouard.

Chassey resembles in many respects Cortaillod, Michelsberg, and Windmill Hill and shows certain relationships with upper Italy. Much of the Chassey material comes from caves which were occupied

seasonally, but some is from lake dwellings at L. Chalain in the Jura or from fortified camps such as the type site, Chassey. So far no causewayed camps, typical of Windmill Hill and Michelsberg, have been recognized within the Chassey area. Chassey pottery, when found in chambered tombs of western France, is associated with Seine-Oise-Marne, Conguel, or Er-Lannic pottery and beakers; tombs assigned to Chassey alone do not belong to the Megalithic tradition.

Chassey ware is normally dark-colored, round-bottomed, and undecorated. Decoration which does appear was usually incised after firing. The forms (Piggott, 1953, Fig. 2 - 4) are baggy bowls, bowls with carinated or S-profile, spherical amphora-like vessels (often with "pan-pipe" handles), wide-rimmed plates, small pots with broad "spade handles" (probably of Italian ancestry), spoons or ladles, and vase supports. Most of the square vase supports, characteristic of Er-Lannic (a Chassey derivative in the northwest), were relatively late.

In southern France ornamentation was of a geometric character and incised after firing. Sometimes the incisions were filled with white or red paste, a technique which is absent in Windmill Hill and Cortaillod but common in the Mediterranean. Decoration applied before firing is rare in the south but occurs further north at Chassey, Fort-Harrouard, and a number of Er-Lannic sites. Rows of applied bosses on the edges of vessels also are common, especially in the later phases. Handles and lugs are characteristic.

Incision after firing may be of Italian origin. There are, for example, close similarities between Western pottery and undecorated Stentinello ware in Sicily (Brea, 1950). This pottery appears to be related to certain Egyptian types, notably Amratian. Along the Mediterranean coast it is very often difficult to separate incised-after-firing ware from the impressed ware, which Brea believes to be earlier. Piggott, however, sees no basis for assuming impressed ware (Chateauneuf) preceded early Chassey in southern France.

There seems little doubt that Cortaillod ceramics were derived from south French Chassey (Gonzenbach, 1949, 78; Piggott, 1953, 424). The absence of incised decoration after firing in early Cortaillod was perhaps simply due to the abandoning of this Mediterranean technique when the pottery was copied by Mesolithic tribes.

For the manufacture of axes a variety of stone was used in the south, while flint predominated in the north. A large share of the axes are "Campignian" forms, illustrating connections with French flint mines. Transverse points were retained from the Mesolithic, especially in western sites like Campniac, Manio, and Castellic. Leaf-shaped arrowheads are common in north and south Chassey, although extremely rare in Brittany. Nor do they occur in Cortaillod, where the triangular or hollow-based type is predominant. The triangular and leaf-shaped points are associated at Catenoy and Chassey. Grand-Pressigny flint is rarely a feature of Chassey; from all appearances, it was exploited later, during the late Neolithic and Early Bronze Age. In the north and west of France a number of

flint mines were worked by the Chassey people, who are thus a part of Nougier's "Campignian" tradition.

Except pendants and amulets, there are few bone and antler remains. Antler sleeves are known from a few sites, and polishers and awls made on metapodals are found on almost all sites where organic material has been preserved. Harpoons are normally unilaterally barbed (Fig. 10: f), in contrast to Cortaillod points, which are usually bilaterally barbed like the Azilian type. Bone and antler fishhooks are reminiscent of Maglemose fishing equipment, and antler combs (Fig. 10: i) also may have been derived from the Mesolithic.

The sites at L. Chalain have produced some wooden artifacts, such as bowls, spoons, bows, axe hafts, and combs, as well as fabrics of wool or vegetable fiber.

Various pendants and figurines of bone, antler, and clay are associated with Chassey. Stylized representations of the human figure are not uncommon, but characteristic are rounded pendants

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Fig. 10. Western Neolithic bone and antler artifacts.
a. bone pendant
b. bone pick
c. bone wedge
d. antler comb
e. bone awl
f. barbed antler points
g. antler pendant
h. bone pendant
i. antler comb

(a - e: Windmill Hill; f - i: Chassey. After Piggott, 1953 and 1954b.)

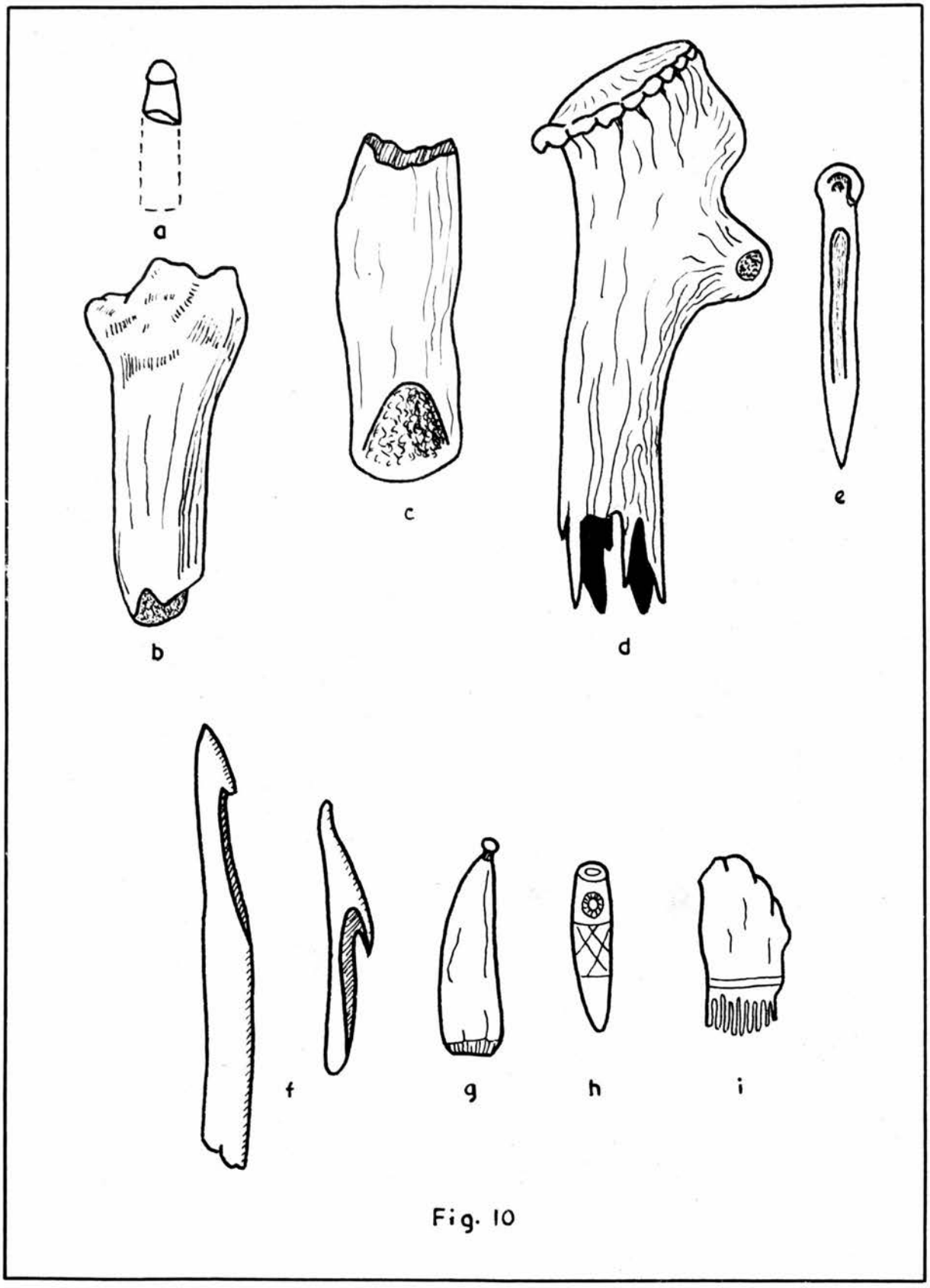

Fig. 10

which are notched (Fig. 10: g) or segmented and sometimes perforated. Some pointed ornaments have incised linear or geometric decoration (Fig. 10: h). Perforated animal teeth are relatively rare.

Chassey's economy was based primarily on farming and herding, although some hunting and fishing is indicated by the implements and the occurrence of wild fauna. Bones of wild animals are relatively rare, but deer, hare, and boar sometimes are found in small numbers. Among the domestic animals, cattle ordinarily represent the largest group.

In the north, contact was established with Mesolithic people, and in the Swiss lake region Chassey developed into Cortaillod. Also in the east there was probably a contribution to Michelsberg. Colonists crossing the Channel from northern France initiated Windmill Hill culture. Early Chassey and Chateauneuf, in southern France, were contemporary with Arene Candide I - II and therefore with Central European Danubian II. In northern France, the Chassey sites belong to a period preceding Michelsberg and the exploitation of Grand-Pressigny flint.

In contrast to Northern Europe, metal came into use not long after the advent of the Neolithic in France. The economy at first remained essentially Neolithic, i.e., metal objects were obtained through trade or manufactured only by the simplest processes. The term "Chalcolithic" is one of descriptive, not chronological, value.

Chassey-type ceramics persisted but with the infusion of channeled ware and beakers. With the beakers are associated tanged

daggers, awls, and small rings of bronze. While the Chassey figurines were faceless, the accent was now placed on the facial features. The whole complex is frequently associated with burial in chambered tombs, which are often gallery graves. This mixed Chalcolithic is grouped in coastal clusters, suggesting that it represents a maritime civilization of Mediterranean antecedents which expanded along sea routes. The beakers are generally thought to be of central Spanish origin, but Piggott (1954a, 4) thinks a source on the Mediterranean coast more likely. The Beaker people managed to maintain a large share of their individuality while mixing with other groups. Therefore, Beaker elements were much the same over all France. The channeled ware, however, is present in three distinct regional facies: Fontbouisse in southern France, Conguel in Brittany, and Peu-Richard in the Charente and Girounde. With these are found Er-Lannic and Er-Mar ceramics, derived from Chassey.

Fontbouisse (Gard) is the most important of about thirty sites in southern France containing channeled pottery. The ceramics are mostly decorated with vertical or horizontal grooving in alternate panels or with concentric semi-circles or chevrons. At one site, this type of ornamentation is associated with double warts or nipples forming an anthropomorphic design, recalling the facial motifs on Los Millares pottery; thus a connection between Fontbouisse and Los Millares ceramics seems altogether possible (Ibid., 8). However, along with this anthropomorphic tradition go the engravings and paintings in south French caves and the "menhir-statues" portraying

the human figure in two dimensions, which are allied to Portuguese schist idols rather than Los Millares sculpture in the round. Finer comparisons suggest a closer association of Fontbouisse ceramics with certain Portuguese pottery than with Los Millares ware, and the presence in southern France of engraved schist plaques of Portuguese style supports this assumption.

The Fontbouisse sites appear to be related to sites in both Portugal and Sardinia, for rock-cut tombs are found in all three areas. The concentric semi-circle motif of Fontbouisse ware appears on Cortaillod pottery with birch-bark incrustations, and channeled ware and handled vases like some found in the south of France were associated with late Cortaillod pottery at Arene Candide IV. Thus, Fontbouisse ceramics offer a limited correlation with the Swiss chronology. Fontbouisse appears to be about the same age as the Beaker material. At the type site itself were a beaker sherd and two daggers.

The Peu-Richard ceramics, named after a fortified site in the Charente, are the most clear-cut group of the French channeled ware, and it was J. Hawkes (1939) who first showed that this pottery belonged to the channeled ware complex. Most peculiar are pots decorated with a pair of stylized eyes, each one of which often surrounds the opening of a tunnel-handle set in the wall of the vessel. Otherwise unknown in France and Iberia, such vessels occur in Sardinia and Malta, which implies contact with the Mediterranean. On the other hand, the passage graves of Charente are similar to those of Almeria.

With the Peu-Richard pottery are found Er-Lannic ceramics with incised or punctate decoration. These also appear with Almerian "symbolic" ware, whose decoration is inspired by the human face.

There is in Charente a certain amount of undecorated ware which is possibly of Chassey origin. Peu-Richard ware has never been found with Beaker material, but the two groups undoubtedly were contemporary.

Most of the Conguel sites are in Morbihan. A majority of the vessels, with concentric arcs or alternating panels of vertical and horizontal channels, are related to southern French types. A few with incised zigzags resemble a Peu-Richard pot from Availles-sur-Chize. At the type site Conguel ceramics were shown to be stratigraphically older than beakers, but there is no reason this is true over all Brittany. Conguel pottery seems to be the most closely related of any Breton pottery to Scottish Beacharra, which does antedate the Beaker occupation of Britain. Relationships also can be shown with ceramics of the Scandinavian Passage Grave period. Again in Brittany there are undecorated "Chassey" vessels which are hard to distinguish from those in Iberian contexts.

During the Chalcolithic appeared two groups often included under the term "Chassey." The Er-Lannic ware is characterized by incised or punctate decoration filled with white paste, while Er-Mar pottery has small nipples over most of the pot surface. Especially in the Er-Lannic group are found the peculiar vase-supports known in Chassey. Er-Lannic pottery is known in southern France and

Charente but is centered in Brittany. The Er-Mar pottery is hardly represented in southern France but is common in Brittany, northern France, and Burgundy. Both are found in Britain and the Channel Islands.

Vase-supports fall into two categories: rectangular cups incised after firing and cylindrical supports. The rectangular type appears to belong to early Chassey because of its decoration. The second type is probably intrusive. Both were present at Fort-Harrouard.

In the Iberian peninsula, vessels much like Er-Lannic and Er-Mar ware appear in Almerian chambered tombs with channel-decorated céramique à symboles, but there are no vase-supports. In Sardinia, Anghelu Ruju yielded Er-Lannic style pottery in association with Beaker material and some pots with tunnel-handles like those of Peu-Richard. At Lipari, north of Sicily, imported Mycenean sherds of c. 1550-1400 B. C. were associated with vase-supports and pottery with punctate decoration. In Britain, the Bronze Age "incense cups" are copies of French vase-supports. Correlations between the British Bronze Age and Central Europe suggest a date of 1550-1300 B. C. for the former. Therefore, the Er-Mar and Er-Lannic phases must have lasted at least until the 15th century B. C.

The same French influences can be seen in the Secondary Neolithic Rinyo-Clacton group of Britain, which was approximately contemporary with the Beaker "invasion" of Great Britain.

Cortaillod

Although of minor significance, there are some traces of Danubian settlement on the upper Rhine in Switzerland (Kimmig, 1950, 137-8). From the Kolmar region are graves and early Linearbandkeramik and from Kaiserstuhl and Tuniberg several late Linearbandkeramik complexes. Among the sites of this last area, Opfingen at Tuniberg almost certainly had a great settlement similar to Köln-Lindenthal. Most of the Danubian influence was localized around the bend of the Rhine near Basel.

Numerous shoe-last celts from the Sundgau region appear to belong to south German Stichbandkeramik or Rössen. Rössen was the only Danubian group which really penetrated Switzerland effectively; it occasionally occurs in association with Cortaillod in the Early Neolithic.

Within the Cortaillod culture, two regional and two chronological ceramic phases are discernible. In both the early and late periods can be recognized a West and a Central Swiss facies, which are due partly to local variation and partly to influences from other cultures (Gonzenbach, 1949, 5).

Early Cortaillod (Egolzwil)

In the West Swiss group most of the pottery is thin-walled and well-fired, and the outer surface of the smaller pots has a shiny black polish. The unity of the pottery lies in the rounded bases and simple shapes, while the primary difference is between storage pots and finer vessels. The first group includes deep basins, hemispherical bowls, and globular pots which characteristically have ornamental warts

as decoration. The smaller vessels are small beakers, deep or shallow bowls, forerunners of the late Cortaillod angular (Knickkalotten) bowls, and flasks. Spoons are rare.

This group of ceramics is known only from pile-dwellings on L. Neuchatel and Bielersee, but this must be at least partially the result of incomplete exploration. These ceramics are clearly but one part of a tradition which extends south into Italy and west into southern France.

The Central Swiss group is not so well defined, for only one site, Seematte, has early Cortaillod in a stratigraphical relationship with late Cortaillod. Eastern sites which provisionally mark the eastern boundary of early Cortaillod distribution---Bauschanze, Kleiner Hafner, and Obermeilen on L. Zurich---are difficult to define, since most of the finds have been dredged up over a long period and are mixed with Michelsberg. At Seematte, most of the pottery is the same as that of the early West group, but the large vessels have applied fillets with fingertip impressions. This sort of decoration appears in Michelsberg and Rössen, the last being the most likely source as far as early Cortaillod is concerned. Decorative warts or bosses are also present. Flat-based bowls are peculiar to the Central group.

In the Wauwiler Moor around Egolzwil and Wauwil are a number of pile-dwellings, such as Schötz I, Egolzwil I, and Egolzwil IIa, in which the lowest horizon corresponds to early Cortaillod. Although the pottery is essentially the same as that of the West group, among the ceramics are some of Rössen ancestry. At Schötz I, for example, there are globular

pots resembling similar undecorated vessels of Rössen and also some stroke-ornamented potsherds which are paralleled in south German Rössen.

On the basis of excavations at Egolzwil III, Vogt (1951) extends the name of the site to replace the designation "Early Cortaillod." Egolzwil III is particularly informative because of the number of organic remains, especially wood. Manure was present in quantities large enough to assume that animals were kept right in the village. The site was inundated after being abandoned, and the waterlogged piles sank in place. The large amount of bark found in the site suggests this was used as an insulating foundation upon which the dwellings were built, as was the case in many Mesolithic sites. The concentration of lightweight articles which were cast aside shows they couldnot have been dropped even in still water. Probably a strand was uncovered for awhile and occupied, later being submerged again.

Stone axes were comparatively few in number, and most were of serpentine. A rather poor shafthole axe came to light and is peculiar to Switzerland. The majority of the axes had a pointed-oval cross-section and hardly any were completely polished. In connection with axes, there were about thirty axe hafts of ash (only one of which still held its blade). The most distinctive implements were a number of sickles consisting of a blade set diagonally into a straight wooden haft. These are different from any other type of sickle known, including later Cortaillod

implements. The remaining stone tools were of less importance. There were several scrapers and a single hollow-based arrowhead. Besides the wooden axe hafts were recovered some tools of unknown use. These were made of branch forks, one segment forming a haft and the other a pick-like blade. They may have been used for grubbing or hoeing. Other wooden objects were bowls, clubs, cups, birch-bark rolls, and so forth. Bone and antler remains were not numerous—a couple of spatulas, a comb fragment, awls, and a perforated boar's tusk lamina.

There are really only two types of ceramics from Egolzwil III, cooking pots and flasks. The first are all round-bottomed and have two handles just under the rim, which is usually everted or inverted slightly. Otherwise the profiles are very simple. Incised strokes or pits occur rarely; in most cases there are just one or two warts between the handles. The flasks have ovoid bodies, short necks, and handles near the middle of the vessel. These pots are not decorated. Rössen influence is indicated by one fragment of a flat-based vessel and an ordinary Rössen globular beaker with incrusted furrowed-stroke ornamentation.

Although faunal remains were scarce, wild animals were well in the minority. Domestic animals were led by swine, with sheep and goats second in number. No cattle were identified, which is surprising since cattle normally make up the largest percentage of domestic animals.

The picture at Egolzwil is fairly clear. The pottery corresponds fully with that of early Cortaillod, and its purity here is rarely found elsewhere. Vogt believes the site representative of a cultural division rather than just a local variation and is in fact of the opinion that the differences between early and late Cortaillod are too great for one to have developed out of the other. He therefore suggests we refer to the later group as "Cortaillod" and the earlier phase as "Egolzwil." Whether or not this distinction is justified will have to await further investigation of the early period.

The Rössen element shows the settlement cannot be older than the appearance of late Danubian cultures in northern Switzerland and southern Germany. Radiocarbon analysis of two wood specimens from Egolzwil III yielded dates of c. 2950 and 2700 B. C. respectively (Zeuner, 1955, 47-8), and Troels-Smith (1956) reports an average date based on radiocarbon data of about 2740 B. C.

Late Cortaillod

Within the ceramics of this later phase there appears to be a continuity of style in the storage vessels, but new or modified forms make their debut. The pottery also varies in different areas of distribution. In the east, Michelsberg influenced Cortaillod ceramics to a considerable extent.

The West Swiss group (Gonzenbach, 1949) includes among its ceramic forms a variety of angular bowls and beakers, rare "suspension" vessels, flasks, "lamps" like soup plates, spoons, globular pots, great storage vessels, and necked amphorae. The angular bowls

are the sole West Swiss form which is decorated, and this type of vessel is distributed from northern Italy to southern Spain. The "suspension" vessels are not common and are the only pots among the fine ware which do not have the polished black surface. One type of flask is decorated with two large breast-shaped bosses, which is perhaps a "Mother Goddess" motif.

Most of the ceramic forms have perforated lugs (often in pairs), which were of more a functional than an ornamental nature. Scratched decoration on the angular bowls was applied after firing as in Chassey, and the remnants of white incrustation are still to be seen in the incisions. This form of decoration, however, is more common in Central Switzerland. A specialty was the practice of sticking thin layers of birch-bark upon the black surface of the vessel to produce pleasing color contrasts. One bark-incrusted vessel (Gonzenbach, 1949, Pl. V: 1) with a concentric arc motif perhaps provides a correlation with south French Channeled Ware. This fits in with the association at Arene Candide of channeled pottery and late Cortaillod (Lagozza) ware (Piggott, 1954a, 10-12).

Many of the ceramic features are duplicated in southern France and upper Italy, and there are a few parallels on the southeast coast of Spain.

In the Central Swiss group most elements are the same, but a few variations are detectable. The best sites of this group are Egolzwil II, Seematte, and Burgäschi-Ost. Among the special ceramic forms are a high beaker with a slightly rounded base from Egolzwil II

(there is a duplicate in wood from the same site), pots with a marked S-profile and perforated lugs, flat-based bowls, and large flask-like vessels with flattened shoulders, upon which are perforated lugs. Specifically attributed to Michelsberg are amphorae, handled pitchers and beakers, baking plates, and spoons. Decoration consists of strokes or stabs applied before firing, fingernail impressions, excellent bark ornamentation, grain-kernel impressions, warts, and cordons with fingertip impressions. The stroke-ornament and fingertip or fingernail impressions are Michelsberg techniques. The Michelsberg intrusions constitute the primary difference between Western and Central ceramics.

Vallon des Veaux is the only known Cortaillod land station in Switzerland, and practically nothing but pottery comes from the site. The ceramics seem to be most closely related to Chassey and the Central Swiss group.

In Cortaillod there is a significant variety of stone axes. In the west are axes with rounded cross-section, which are related to Western European types. At Seematte, one finds longer, polygonal axes attributed to Michelsberg influence. In addition, there are perforated hammer-axes, chisels, and Rössen-type shoe-last celts. Also made of stone are millstones, oval netsinkers, and sandstone implements used for pounding bark.

Flint blades are typically small forms with steep retouch. Signs of pitch on some of these show they were at one time hafted, and a few blades have been found in wooden hafts. Irregular pointed

blades, blade scrapers, discoid scrapers, and geometric microliths (from Port-Conthy) are other flint products. Most of the Cortaillod arrowheads are triangular rather than leaf-shaped, but some are hollow-based and a few tanged. Transverse points are very rare (an example from Port-Conthy is illustrated in Vouga, 1929, Pl. XII: 10).

Many artifacts made of antler have been recovered from Cortaillod sites: axe sleeves (Fig. 11: i), axes (Fig. 11: k), picks (Fig. 11: h, j), hammers, maceheads, barbed points (Fig. 11: a), barbless fishhooks (Fig. 11: b), and double-pointed gorges (Fig. 11: c). Small beakers and ladles were manufactured out of horn. Arrowheads and spearheads were made of bone, as were twin-pointed flax combs, daggers (Fig. 11: g), chisels, awls (Fig. 11: d), and skin-scrapers (triangular bone plates with a long point projecting from the apex). Aside from hafts and sickles, there are bowls, spoons, decorated combs, notched arrows, and rudders of wood. Vessels and net floats of bark also appear in some quantity.

Fig. 11. Cortaillod bone and antler artifacts.

a. barbed antler point
b. bone fishhook
c. bone gorge
d. bone awl
e. pendants
f. boar's tusk pendant
g. ulna dagger
h. antler pick
i. antler haft
j. antler pick
k. antler axe Inset: notched pendants, U.S.S.R.

(After von Gonzenbach, 1949 and Raudonikas, 1940.)

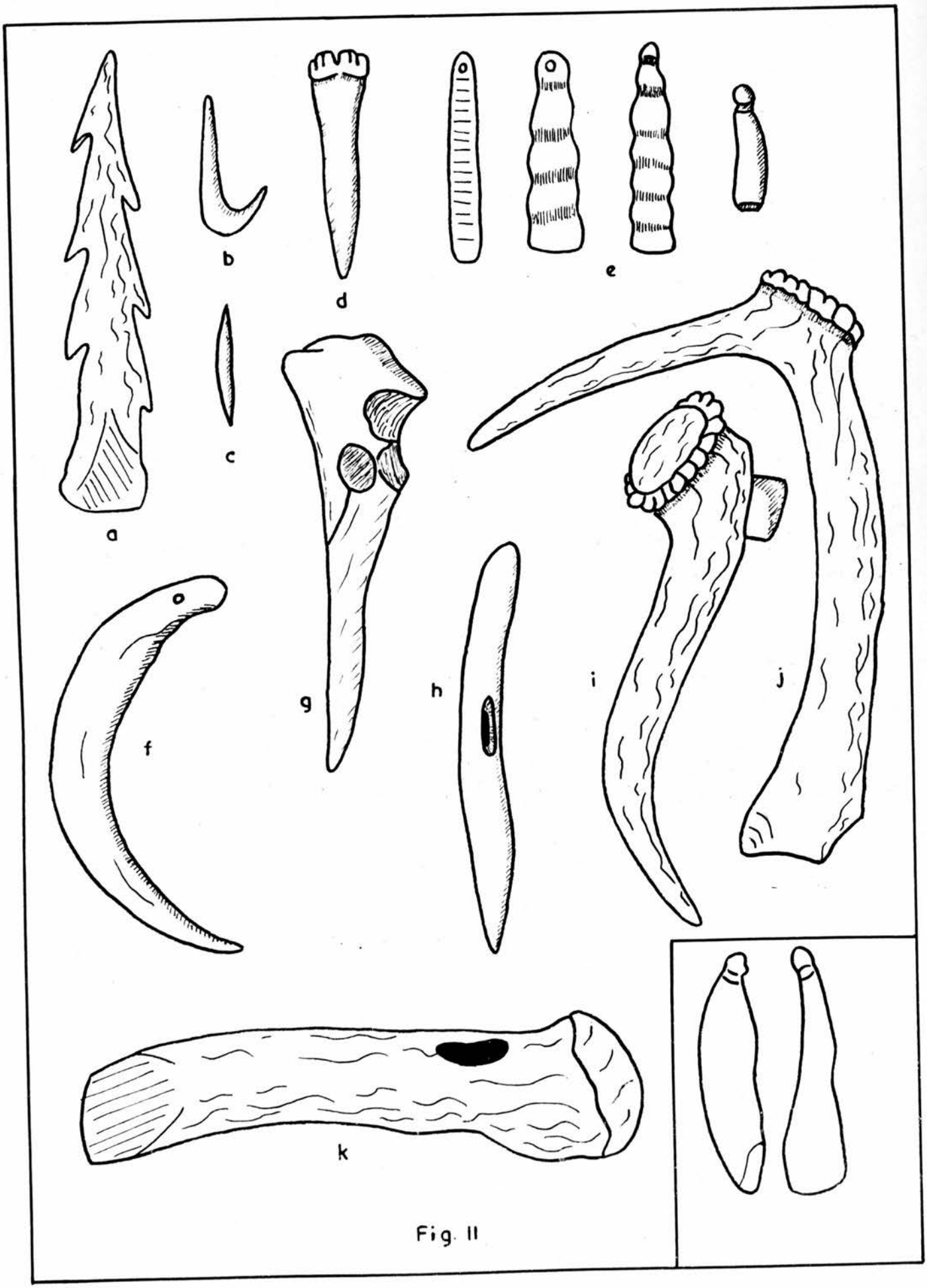

Fig. 11

Ornaments, mostly pendants, occur profusely on Cortaillod settlements (Fig. 11: e, f). Among the forms are rectangular, incised antler pendants, boar's tusk pendants, small perforated deer bones, and notched or segmented pendants like those of Chassey.[1] Beads of stone, bone, and antler are also common. Human cranial discs are reported from Port-Conthy (Childe, 1929, 170). The finest ornaments come from early Cortaillod. Incised geometric designs, for instance, are lacking on late Cortaillod ornaments (even though incised ceramic decorations occur). Figurine fragments are rare and crude; clay figurines of bison, rams, and a dog were identified at St-Aubin IV (Josien, 1956, 29).

The ceramic tradition of Cortaillod was drawn from the Western Neolithic cultures, whereupon it followed its own line of development and was influenced by Central European groups. Probably the Western element forming the basis of Cortaillod diffused up the Rhône from the south French coast. There are no indications that an earlier Neolithic occupation existed in Switzerland. That Cortaillod did not originate as a result of Central European influences is shown by the close resemblance of early Cortaillod to Chassey and other Western groups. Moreover, the use of triangular arrowheads and axes is more typical of North Africa and Western Europe than Western Asia and Eastern and Central Europe, where adzes and slings predominated (Childe, 1950b).

The Mesolithic substratum of Cortaillod is illustrated by the wide use of antler and bark in particular. The barbed points or

1. The notched pendants typical of Western Neolithic cultures are duplicated by ornaments from the Sub-Neolithic Olenii Ostrov site on L. Onega (Fig. 11: inset).

harpoons of antler are not unlike those of south German Azilian (cf. Gonzenbach, 1949, Tab. 8: 9 and Peters, 1934, Tab. 9). The preponderance of lake sites may also be a partial hangover from the Mesolithic settlement patterns.

Characteristic of Swiss Western Neolithic sites is the faunal evidence indicating the importance of hunting in the economy. The percentage of wild animal bones sometimes attains nearly 50% and is almost always in excess of 30%, in striking contrast to the French and British sites with virtually no wild fauna. Josien (1956) has summarized the faunal remains from several (late) Cortaillod settlements in Bern which have yielded sufficient amounts of bone.

On L. Burgäschi, the site of Burgäschi Sud-ouest provided 3279 bone fragments which have been tabulated (according to numbers of individuals) as follows:

cattle	22.6	deer	15.7
sheep	7.8	roe-deer	6.9
goat	2.7	elk	1.4
pig	15.7	ox	6.4
dog	4.1	horse	0.5
	52.9%	boar	7.4
		brown bear	2.3
		wolf	0.5
		fox	0.9
		badger	1.8
		beaver	2.3
		duck	0.9
			47.1%

Most of the wild fauna are forest species, and the majority are large animals. Those like fox and wolf probably were killed as vermin but the rest must have been hunted for meat, furs, horn, or antler. According to the author, the deer remains show clearly that these animals were killed to a large extent for antler. We might add that the large number of antler tools and ornaments seems to prove this.

The proportions of domestic animals, with cattle predominant and pigs next most numerous, is typical not only of Swiss sites but the Neolithic as a whole. Clark (1952, 119) has pointed out that during the Neolithic cattle are almost always the leading animal and sheep or goats subordinate even to swine, except in a few non-forested areas such as Skara Brae and Er Yoh. The implication is that, since cattle and swine are forest animals, sheep were of minor importance until extensive deforestation was accomplished.

At Locras (Lüscherz) in the Cerleier-Erlach district, 1036 bone fragments were analyzed as follows:

cattle	36.5	deer	9.6
pig	8.6	roe-deer	1.9
sheep	6.7	ox	15.5
dog	13.5	horse	1.0
	65.4%	bear	3.0
		bear	1.0
		fox	1.0
		beaver	1.0
		crane	1.0
			34.6%

At this site, the percentage of game was smaller, although wild cattle were second only to domestic cattle as a source of food.

Lac de Lobsigen in the Aarberg district, with 161 identifiable pieces of bone, had 41.2% wild animals. While the number of bones was too small to provide meaningful statistics, the nine animals identified, in order of importance, were: cattle, wild pig, swine, sheep, wild ox, deer, roe-deer, goat, and dog.

At St.-Aubin (Port-Conthy) the Early Neolithic level (Reverdin, 1932) provided these percentages:

cattle	14.4	deer	7.2
pig	21.6	elk	1.5
sheep/goat	20.2	roe-deer	1.5
dog	11.6	boar	2.9
	67.8%	feline	1.5
		fox	2.9
		wolf	1.5
		bear	1.5
		hare	1.5
		squirrel	1.5
		beaver	5.8
		hedgehog	2.9
			32.2%

In this case, no wild species exceeds any single domestic species, and both pig and sheep exceed cattle. It may be noted also that wild oxen are conspicuously absent.

The proportions of wild and domestic fauna from the Early Neolithic at Cortaillod were 43.2% and 56.8% respectively, and at Auvernier, the proportions were 41.9% and 58.1%.

In summary, these six Cortaillod sites present the following percentages of wild and domestic fauna:

	domestic	wild
Burgäschi	52.9	47.1
Locras	65.4	34.6
Lobsigen	58.8	41.2
St-Aubin IV	67.8	32.2
Cortaillod IV	56.8	43.2
Auvernier IV	58.1	41.9

The average proportions on the basis of these figures are 40% for wild species and 60% for domestic species, which is in considerable excess of the 30% often quoted for wild fauna in the Early Neolithic.

With the evidence of harpoons, fishhooks, gorges, and net-floats in combination with the pattern of lake-side settlement, there can be no doubt that fishing was a major industry.

Information from the Wauwiler Moor shows early Cortaillod, or Egolzwil, can scarcely have antedated Rössen. The late Cortaillod settlements show contemporaneity with at least part of Michelsberg. The exact time when Cortaillod disappeared has not been established, but both it and Michelsberg were replaced by Horgen.

If late Cortaillod developed out of the earlier phase, there are no transitional sites to prove it. Vogt explicitly denies any such continuity. Whatever the case may be, there is a break in the development, for although some of the old forms continue new ones appear. A number of the differences must be based on intrusions of Central European cultures.

Windmill Hill[1]

In Britain, the Primary Neolithic is best represented by Windmill Hill culture, which is again part of the Western Neolithic culture-area. Within the framework of Windmill Hill are local variations, but an overall similarity prevails. Previously, this complex was distinguished as "Neolithic A," as opposed to "Neolithic B," which is now termed "Secondary Neolithic" by Piggott.

Three types of field monuments characterize Windmill Hill culture---causewayed camps, flint mines, and unchambered long barrows. The first are regarded as seasonal "kraals" tied in with the herding of cattle, whose closest analogies appear to be with the continental Michelsberg culture. Flint mines, such as Grimes Graves, were certainly worked by specialists during this period, although the mines continued in use well into the Bronze Age. The closest relationships are again with Michelsberg, but it is difficult to derive the British mining industry from Michelsberg unless it is assumed that flint mining was not an integral part of Windmill Hill culture in its initial stages.

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1. Piggott, Neolithic Cultures of the British Isles, Cambridge, 1954.

The long barrows are felt to have a common ancestry with the megalithic tombs rather than being derived from them. The origin of these long barrows is not yet known, but their prototypes appear to be in Western France—in the Morbihan area of Brittany. C. Hawkes (1940, 68) suggested, on the basis of the Tardenoisian Téviec and Hoëdic cemeteries, that the Breton cairns resulted from the contact between native Mesolithic culture and intrusive agriculturalists. Piggott (1956, 100) more recently has suggested posible affiliations between British long barrows and Funnel Beaker tombs, particularly since Michelsberg has been classified as a Funnel Beaker culture by Vogt (1954).

The general features of British Western Neolithic pottery can be described briefly. Western Neolithic pots are usually well made, having rounded bottoms and often smoothed or burnished surfaces. Rims are frequently simple and thin, but are sometimes turned over or beaded. Shoulders and carinations are not unusual, resulting in bipartite bowl forms. Simple "baggy" shapes are typical. Lugs appear frequently, perforated or unperforated, and in one sub-group they developed into tubular handles. Decoration is often omitted; if it is present, it usually involves incision, grooving, punctation, or dots. There is no fine punctated and incised decoration of Chassey style. Ornament may be in curves or panels (Scotland) or in straight or oblique strokes. Herring-bone and zigzag patterns are never employed nor is cord impression normally. The regional variations are as follows: Hembury, Windmill Hill, Abingdon, East Anglia, and Whitehawk. The Windmill Hill ware itself is the closest to Continental pottery like that of Early Cortaillod.

Pottery spoons found on a number of sites probably belong to the Windmill Hill complex. Analogies can be found in Western Neolithic cultures of the Continent.

Hafted axes are the most important tools associated with Windmill Hill culture. Normally, these are of chipped or polished flint; all are core axes, and most of them are thin-butted. Pointed-butted stone axes with oval cross-section occur less frequently. Arrowheads are always leaf-shaped. Scrapers are rough and heavy and usually of horseshoe form. Rough flakes with blunted backs are the only form of knife. Crude "choppers" appear at most sites.

Neither Windmill Hill pottery nor its limited inventory of stone tools contributed greatly to subsequent cultures. There is no sign of Mesolithic influence in the stone-work, except in cases where contact with Secondary Neolithic cultures has taken place.

Bone and antler tools include antler picks, wedges (Fig. 10: c), scapula shovels, bone "hand-picks" similar to "bone axes" of the Scandinavian Mesolithic (Fig. 10: b), pressure-flakers, antler combs for skin dressing (Fig. 10: d), bone pins and awls (Fig. 10: e), and notched pendants (Fig. 10: a). Bone chisels occur occasionally. The antler combs are probably related to hunter-fisher prototypes and are duplicated in Michelsberg.

Perforated blocks, balls, and cups of chalk are distinctive types, and a few chalk human figurines have been associated with Windmill Hill sites. Decorative or representational art is, however, rare.

Grain-rubbers, sickle-flints, and grain impressions attest agricultural activity. Domesticated animal remains include cattle, sheep, goats, pigs, and dogs---all related to Swiss types. As in France and Switzerland, cattle were most numerous. Like most Early Neolithic cultures, and unlike Cortaillod, the Windmill Hill people ignored hunting, except as a means of exterminating vermin. Of the great number of antlers found, 85% to 90% were shed (Clark, 1952, 48).

The exact origins of Windmill Hillare as yet undetermined, but its affinities are primarily with an early stage of the Western Neolithic. Piggott feels that the indigenous Mesolithic cultures gave Windmill Hill its distinctiveness, especially skin-dressing and leather-working and quite possibly flint-mining.

There are a number of features in Windmill Hill, as we have seen, which suggest relationships with Michelsberg. Among these are certain ceramic parallels, causewayed camps, antler combs, flint-mining, leaf-shaped arrowheads, and perhaps long barrows. Such traits appear to denote a common tradition underlying both groups. The flint-mining and antler combs in particular may be of Mesolithic derivation. In view of the postulated Funnel Beaker contribution to Michelsberg (Vogt, 1954), we may be justified in suggesting at least a faint Funnel Beaker sub-stratum uniting Michelsberg and Windmill Hill. Some of the analogous open-mouthed bowls of Windmill Hill and Michelsberg cited by Piggott could be called funnel-necked bowls.

Evidence of the Windmill Hill culture north of the Wash is almost solely in the form of burial monuments, usually long barrows but occasionally round barrows. Windmill Hill elements here are often mixed with those of Secondary Neolithic derivation. At any rate, there is an area from Lincolnshire over to Cumberland and further which is clearly related to Windmill Hill of southeast England.

In order to study megalithic tombs it is necessary to divide them into various regional or typological groups, but the term "culture" should not be used too loosely in considering the burial monuments of the megalithic complex. Piggott classifies British megalithic tombs as follows:

Gallery graves and derivatives:

(1) Severn-Cotswold long cairns

(2) Clyde-Carlingford culture of western Scotland and northern Ireland

(3) Irish galleries and derivative "dolmens"

(4) Miscellaneous local groups, including long cairns

Passage graves and derivatives:

(1) Boyne culture of Ireland

(2) Hebridean passage graves

(3) Orkney-Cromarty tombs of north Scotland

(4) Clava passage graves of Scotland

(5) Shetland group

(6) Scilly-Tramore culture of southeast Ireland and Scillies-west Cornwall

(7) Miscellaneous local groups

Admittedly, these tombs cannot always be associated with other cultural elements, such as pottery, and many of the tombs were in use well into the Bronze Age.

The Clava group is linked with the first passage grave builders in Denmark. It is likely that the building of passage graves and the bronze trade between the Moray Firth and Denmark are two events in a continuum, and may not be too widely separated in time.

On the basis of architecture, the Medway chambered tombs of Kent have long been considered to be of Dutch or North German origin, though there is no direct evidence for this. The other megalithic tombs of the British Isles seem to have had their origins in the Franco-Iberian megalithic complex.

Funnel Beaker

Among the Funnel Beaker cultures of Northern and Central Europe, four major subdivisions have been recognized (Jazdzewski, 1936):

North: Scandinavia, northern and central Germany
West: western Germany and northeastern Holland
East: eastern Germany and Poland
South: regions south of the East Group in Germany and Poland

All the groups are closely related and undoubtedly of a common origin. The East Group remained free from late Danubian and Megalithic influences for a longer time than the North and West

Groups. In fact, the East and South Groups both maintained their non-megalithic status throughout.

Northern Funnel Beaker

Shortly after the Atlantic/Sub-Boreal transition, and possibly earlier (Troels-Smith, 1954), the first farmers reached southern Scandinavia. Within a few centuries these agriculturalists had expanded to the northern limits of deciduous forest (Clark, 1952, 17). This did not mean the termination of Mesolithic culture as such—for inland and coastal hunting and gathering groups co-existed with the farmers well into the Sub-Boreal. In fact, the possibilities of trade created by the presence of the agriculturalists undoubtedly resulted in an intensification of gathering activities (Clark, 1948a, 221).

In contrast to Switzerland, however, the farmers themselves did not adopt hunting as an important economic asset. The sparsity of wild fauna stands out in striking contrast to the high percentage on epi-Mesolithic sites. Gradually, of course, these Maglemose-Ertebølle descendants were acculturated to the new way of life, for we can detect the steady weakening of the older economy. At Ordrup Naes in northwest Zealand (Becker, 1939) were disclosed two distinct Ertebølle occupations, one corresponding with Early Passage Grave and the other with a later Neolithic period. In the lower level, red deer, roe-deer, grey seal, porpoise, water vole, duck, razorbill, and mackeral made up 70% of the fauna, with cattle, sheep, and pig providing the remainder. In the upper level domestic fauna

increased from 30% to 60%. The later occupation contained the same animals, with the exception of the addition of horse. The second component also lacked Ertebølle pottery and axes.

Another type of illustration concerning the exchange and mixture of Mesolithic and Neolithic elements can be gleaned from the contemporary neighboring sites of Strandegaard and Havnelev in southeast Zealand (Mathiassen, 1940). Havnelev, situated on good agricultural land, yielded characteristic Neolithic remains: emmer, wheat, and barley; querns; cow, sheep, and pig bones; few remains of wild fauna (mostly deer); thin-butted axes and polygonal battleaxes; collared flasks and funnel-necked beakers, but no Ertebølle pots. It also contained over 150 flake axes and a few cord-ornamented beakers. Strandegaard, on the other hand, showed no sign of cultivation and the ox was the only domestic animal, but there were remains of seal, boar, red deer, and dove. Flake axes outnumbered core axes over four to one, only four thin-butted axes were found, and there were approximately as many Ertebølle jars and lamps as Neolithic vessels. The Strandegaard inhabitants possessed an excellent blade technique, which was poor in both quality and quantity at Havnelev.

There are enough common traits to enable us to place both in the Early Neolithic, but the Strandegaard people were evidently Ertebølle hunters influenced by their Neolithic neighbors, while the Havnelev people must have been new.

These first Danish agriculturalists are recognized primarily by their ceramic inventory of funnel beakers, collared flasks, and

amphorae. Consequently, their culture is termed "Funnel Beaker" (Childe's First Northern) and belongs to the more inclusive Northern Funnel Beaker Group as defined by Jazdzewski.

Montelius' old terminology for the Scandinavian Neolithic has been replaced by Early Neolithic (I - II, Dolmen), Middle Neolithic (III, Passage Grave), and Late Neolithic (IV, Dagger or Cist).

Until recently, the Early Neolithic was synonymous with dolmens and their associated grave goods. However, C. J. Becker (1948) has revised this and, like Montelius, postulated a pre-dolmen Neolithic period. His conclusions rest primarily upon ceramic material, particularly funnel beakers. Becker's pots were all deposited in former lakes or bogs with no stratigraphy of any sort. The finds consisted of one or more vessels, in some cases associated with wooden spoons, flint and greenstone axes, or bones (ox, sheep, swine, wild fauna, human). Some of the deposits were found on wattle platforms supported by vertical piles. The most frequent bog form was the funnel-necked beaker, which falls into five groups:

A: a short, evenly splayed neck passes smoothly without shoulder into an ovoid body with a flat bottom. The only ornamentation is one or two rows of stabs or short strokes just below the rim.

B. a fairly high neck is separated from the body by a distinct angle; the bottom is round or rounded, and ornamentation consists of dots and horizontal patterns in simple cord impressions or incised lines--

usually just below the rim. Thus, this group includes the so-called corded beakers (Urbecher), previously thought to constitute a separate group.

C: this type recalls the B beakers but is always flat-bottomed and more profusely decorated. Originally thought to be confined to central and north Jutland, there is now a C beaker typical of Zealand which resembles funnel beaker sherds in the early habitation of Siretorp (Becker, 1949, 242-3).

D: there are two subdivisions. (I) is a coarse, fairly short-necked form with chevrons and rows of pits on the neck. (II) is often tastefully decorated and possesses a very long splayed neck.

E: the final phase is characterized by degenerate pottery.

Beakers of type E have been placed in an advanced phase of Middle Neolithic. Beakers of stage D occur in early Middle Neolithic (Passage Grave), e.g. at Tr/ldebjerg, the earliest Passage Grave phase according to Mathiassen (1944). Type C occurs in dolmens and contemporary earthgraves. B beakers are represented at Havnelev in Zealand, in the famous grave at Virring in Jutland, and in certain shell mounds. Although Becker at the time could not prove that A beakers were earlier than B beakers, they have now been placed in an Ertebølle context by Troels-Smith (1954). Doubt was also raised (Mildenberger, 1953, 93) as to whether

Becker's A and B beakers actually represented the earliest funnel beakers and not just local developments contemporary with beakers of type C.

In answer to Troels-Smith, who insists A beakers belong to Ertebølle, Becker (1955) has produced what he believes is a purely Neolithic A beaker occupation at Store Valby in western Zealand, where there was no Ertebølle pottery whatsoever. Although no animal bones were preserved to show the relative importance of hunting, a number of sherds bore grain impressions.

Becker interprets mixed Ertebølle as a hunting economy which, even though coming into contact with farming cultures, continued almost intact well into the Passage Grave period. Mixed sites are to be interpreted as intrusions of one group or the other. Admittedly, he has several strong points in his favor: Neolithic cultures passed through continuous stages of development while Ertebølle remained unchanged, Ertebølle pottery did not disappear with the advent of A and B beakers, and grain impressions in no instance have been found on Ertebølle beakers.

Store Valby also has added to the ceramic inventory of Early Neolithic A, for in addition to the ordinary funnel beakers were funnel-necked cups, storage vessels, and flat "baking plates" (Backteller).

It is to be noted that many disagreements regarding the Neolithic are due to megalithic graves being considered the primary cultural element of the period, whereas the tombs probably represent only an

ideological phase which may have been similar in different cultures or vice-versa. "Megalithic" should not be confused with "culture."

Becker extends A, B, and C to subdivide the Early Neolithic and then discusses relationships with various areas of Europe. Period A in Denmark is represented at Store Valby and in mixed sites. Period B includes all well known pottery types; sites like Havnelev also yielded polished thin-butted flint axes, polygonal battleaxes, domestic animals, and grain. Period C consists of three local groups: North Jutland, South Danish Megalithic, and Bornholm-South Swedish. The first disappeared before the end of Early Neolithic. In all of these, pottery is of the same main types and based on the simpler B pottery, i.e., there was no foreign influence. During Period C the non-megalithic groups were gradually displaced by the Southern Megalithic group spreading from southern Denmark (Becker, 1949, 248). When Becker speaks of "megalithic" here, he is including the use of dolmens. Other Danish C groups continued using flat graves until displaced by the South Danish Megalithic group.

It is now generally accepted that dolmens (dysser) did not arise from the megalithic complex of Mediterranean and Western cultures, since Danish dolmens are single graves intended for one burial. In the East and South Funnel Beaker groups extended individual burials were placed in cists made of stone slabs. The Danish dolmen is merely a local version of the cist burials common to all Funnel Beaker groups (Childe, 1949, 134).

In Sweden and Norway, there is no definite trace of Period A. Most important in the B phase is the site at Oxie in Scania, which is closely related to Havnelev and where pointed-butted flint axes occur for the first time in their natural environment (Becker, 1948). Period C material is prolific enough to recognize three non-megalithic and one megalithic group in Sweden. The Middle Swedish Vrå culture was a non-megalithic Funnel Beaker group with permanent settlements. It seems that the Middle Swedish group C did not survive into the Middle Neolithic but was displaced by a hunter culture with a certain megalithic strain from the west coast and, in some areas, by the South Danish Megalithic Group. One or two non-megalithic Funnel Beaker groups were progably present in Norway, but almost nothing is known about them. In the southeast coastal area are "votive deposits" of stone axes, stray polygonal battleaxes, and at least one dolmen, but in general Norway was still dominated by Mesolithic groups, according to Hinsch (1955, 163).

On the Continent are a number of funnel beakers and lugged flasks (amphorae) which resemble Danish A and B types. Becker places these in a composite A - B group and assumes subsequent developments follow a course similar to that in Denmark. As in Denmark, the A - B foundation underlay a variety of megalithic and non-megalithic local groups.

A number of Funnel Beaker traits were of Mesolithic origin: extended burial, votive bog deposits (going back as far as Hamburgian and Ahrensburg), use of amber, transverse arrowheads, tranchet axes, and blunted arrows.

Childe would include battleaxes, since he feels they were ultimately derived from Mesolithic antler axes (Childe, 1934, 158), but this has been criticized as a rather shaky hypothesis. Although some Continental battleaxes may have features derived from antler axes, the ultimate source was undoubtedly Near Eastern stone and metal axes which had no antler prototypes so far as is known. The inevitable cylindrical shaftholes in battleaxes also point toward the Near East.

Stone battleaxes are known from the 3rd millenium in Anatolia (especially Troy) and even Palestine. Excavations at the fortress of Ay (Et-Tell) have yielded a number of connections with the North (Prausnitz, 1955). Two stone hammer axes, which have been assigned to the Palestinian Early Bronze Age, are very like those of Troy's "Treasure L," which in turn seem to have affinities with certain Caucasian and North European battleaxes. At Ay, one ivory and three bone handles with incised geometric ornamentation provide another probable link with the North. Such handles have also been recovered at Ras Shamra, Byblos, Megiddo, and elsewhere in the Near East. Certain Ay pottery is related to Kh. Kerak ceramics of the southern Caucasus. This Ay material and "Treasure L" (late Troy II) are dated c. 2400 B. C.

From the beginning of the Scandinavian Neolithic stone types were influenced by metal forms (Glob, 1948, 84). Most stone artifacts were polished---except for flake and blade tools of Mesolithic derivation. Among the polished tools of Period C are tongued

clubheads, thin- and pointed-butted stone or flint axes, flint halberds, stone "plowshares" (perforated celts), and cylindrically perforated battleaxes with expanding or drooping blades. Spoons, vessels, and hafts of wood appear in bogs.

As Clark (1952, 172) indicates, practically every technique in Neolithic stone-working had been anticipated by Mesolithic craftsmen. The latter had already extended Upper Paleolithic bone and antler polishing to stone, e.g., Ertebølle pecked and ground axes. Stone-cutting by the use of sandstone and wood or bone with an abrasive was another extension of antler- and bone-working techniques which appeared among hunter-fishers, as in the Finnish dwelling-places. This last principle as applied to cylindrical drilling of stone axes, however, first appeared in Europe during Danubian I. It is probable that a tubular bone drill with sand and water as abrasive was used for producing cylindrical perforation. The use of a tubular drill is verified by numerous unfinished axes with the core still in place; the cores themselves turn up on various dwelling-places (Schwantes, 1952, 125). (For unfinished specimens, see Ailio, 1909, I, Fig. 33; and II, Fig. 6 and 53.) It is likely that a bow-drill set-up was used for the drilling.

A Zealand settlement on Neksel⁄ Island contained eight discernible cultures ranging from Ertebølle to Iron Age, although stratigraphy was virtually non-existent. Among the recovered artifacts was a "scapula knife," which is duplicated at other sites. Made of ox scapulas with two perforations on the back edge for hafting, they are

tentatively assigned to Funnel Beaker Culture (Becker 1952a, 107).

In recent years single-piece hafts for thin- and thick-butted axes have been found in Denmark (Becker, 1945; 1949). The hafts are round and made of ash and at the top are increased in width and perforated to receive the axe blade. In the case of the thin-butted axes the butt stuck out the back; the butts of the thick-butted axes were nearly flush with the back edge of the haft. The hafts are perforated in a manner which results in the blade's projecting downward, producing an acute angle of about 80 degrees between haft and blade.

One excellent haft came from the Magleby Long bog in southwest Zealand. At this same site were found funnel beakers and clubheaded wooden arrows. These were evidently votive deposits, since the arrows had been deposited in bundles (Becker, 1945, 162). On one site type B funnel beakers were found near a hafted thin-butted axe. Another haft for a thick-butted axe seems to have been specifically for ritual deposit. This shaft is short but complete, so Becker feels it was originally set up either in the ground or in some sort of holder. "Sacred axes" apparently played a major role in the Stone Age; typical of the Passage Grave period are stone and amber representations worn as amulets. Since axe deposits also appear in Continental Funnel Beaker contexts, this ritual importance of axes appears to be a Funnel Beaker trait.

The end of the Early Neolithic Period in Denmark was probably near the time of the East Anglian coastal submergence following the

arrival of the first (B) Beaker people in Britain (Childe, 1950, 126).

The first Neolithic farmers in the north, as defined by funnel beakers of types A and B, left few traces of themselves. They apparently were transitory farmers with a customary ritual involving the deposit of pottery and axes in bogs. Such a culture almost certainly did not originate in Denmark. Although certain traits link the Early Neolithic inhabitants with Northern Forest Cultures, many of its cultural elements---including pottery, grain production, animal husbandry---can hardly have been of Mesolithic origin. These people must rather be seen as immigrants who entered Denmark near the Atlantic-Sub-Boreal transition, whereupon they mixed with the indigenous Mesolithic population.

In Period C of the Early Neolithic dolmens were in use for single burials. Presumably, in Periods A and B the dead were buried only in earth-graves, which continued to be used during Period C and even the Middle Neolithic. Funnel beakers, collared flasks, and amphorae appear in association with the familiar polygonal battleaxes, thin-butted axes, and transverse arrowheads. Rather elaborate whipped-cord ornamentation began to be used. For axes, flint was preferred to stone, and amber was highly valued for adornment if not for its magical properties. At Barkaer in Djursland were rectangular houses which have been assigned to Early Neolithic. These may have been derived from Danubian houses (Schwantes, 1952, 152-3).

Nothing certain can be established regarding the origin of Funnel Beaker culture, but a number of theories have been put forward. One, which was held for many years, is that the Scandinavian Neolithic stemmed from the eastward diffusion of the British agricultural complex, but there are few resemblances between the Scandinavian Early Neolithic and any Western Neolithic culture, except the round-bottomed pots of Period B for which some sort of Western influence might conceivably be invoked (Becker, 1948). An attempt also has been made recently (Hinsch, 1955) to find Western Neolithic origins for the Funnel Beaker cultures (on the basis of pottery and transverse axes), but the evidence is not convincing and ignores the fact that Funnel Beaker groups appear almost simultaneously as far east as Poland.

Another explanation, which is that given by Jazdzewski (1936) and maintained by Kostrzewski as late as 1949 (American Journal of Archaeology 53: 355), rests on the assumption that all Funnel Beaker groups came from an original center in Jutland. This leaves us with the question of how it became established in Denmark. The possibility of an indigenous development seems impossible and all the Funnel Beaker groups seem to have appeared at about the same time anyway. It is more likely that all were local developments from a common prototype.

Becker denies any affinities of Funnel Beaker culture with either Danubian or Western cultures and sees the three as independent European Neolithic traditions. He feels the origins of Funnel Beaker culture must be sought in the southeast, beyond the Danubian sphere. In the eastern Ukraine and Kuban regions, certain parallels are to

be seen in battleaxes and ceramics, although those types which are closest to northern forms are relatively rare (Sturms, 1952, 14-15). Any valid assumptions concerning a southeastern origin must rest on more intensive investigations in that area.

The final theory suggests an acculturation of Mesolithic people on the north European plain by Danubian farmers. It is of interest that the oldest Funnel Beaker culture in Germany is found where the Danubian cultures had their northernmost settlements (on the Weichsel and lower Oder), and instead of being confined to the loess the former lived on streams, rivers, and coasts (Schwantes, 1952, 148-9). Childe (1949, 134) has also noted that Danubian farmers spread beyond the loess and reached the Baltic, where an early phase of Funnel Beaker Culture has been found. To explain the differences in ceramic types, he maintains that, rather than copy Danubian gourd-shaped pots, the northern inhabitants would naturally attempt to reproduce their old skin and bladder vessels. However, a number of ceramic correspondences exist in any case.

Mildenberger (1953) has carried Childe's assumptions still further by looking for specific parallels in Danubian or related cultures. The most characteristic pots of the Funnel Beaker culture, funnel-necked beakers, appear in the older levels of Vinča (Fig. 12: o), although they are actually wide-mouthed bowls instead of beakers. However, in the east central European Funnel Beaker complexes, funnel-necked bowls are the leading form. They also are assigned to the earliest Baalberg phase by Grimm (1937, 157-62). Footed bowls

with a funnel-shaped upper part are present in Jordansmühl. Other funnel beaker forms are known in Theiss (Fig. 12: g, h, k, l, r, s), Lengyel (Fig. 12: q), the Thessalian Late Neolithic and Early Bronze Age (Fig. 12: i, c), and Stroke-ornamented Ware (Fig. 12: m).

At the Hungarian cemetery of Zengővárkony, which is related to Theiss and in certain respects to Bükk (Dombay, 1938, 218), there are a number of vessels which are clearly funnel beakers, although most are ornamented with applied bosses.

The amphorae, or lugged flasks, also have prototypes in Danubian cultures: Vinča B and C (Fig. 13: f, h), Erösd, Tisza, Central German Bandkeramik (Fig. 13: i), Theiss (Fig. 13: c), Körös, and Lengyel.

The handled jugs (Kannen) of the Central German Funnel Beaker cultures have analogies in Danubian and Balkan cultures (Fig. 13: k, l).

The origin of the collared flask remains a problem. Its wide distribution from Iran to Western Europe suggests it may be a clay imitation of some organic prototype. Childe felt at one time

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Fig. 12. Neolithic funnel beakers.

a. Danish Early Neolithic A
b, d, j, n. Danish Early Neolithic B
c. Thessalian Early Bronze Age
e, f, p. Baalberg
g. Theiss
h, k, l. Zengővárkony (Theiss)
i. Thessalian Late Neolithic
m. Stroke-ornamented Ware
o. Vinča C
q. Lengyel

(After Becker, 1948; Grimm, 1937; Buttler, 1938; Schroller, 1933; Milojčić, 1949; Dombay, 1938.)

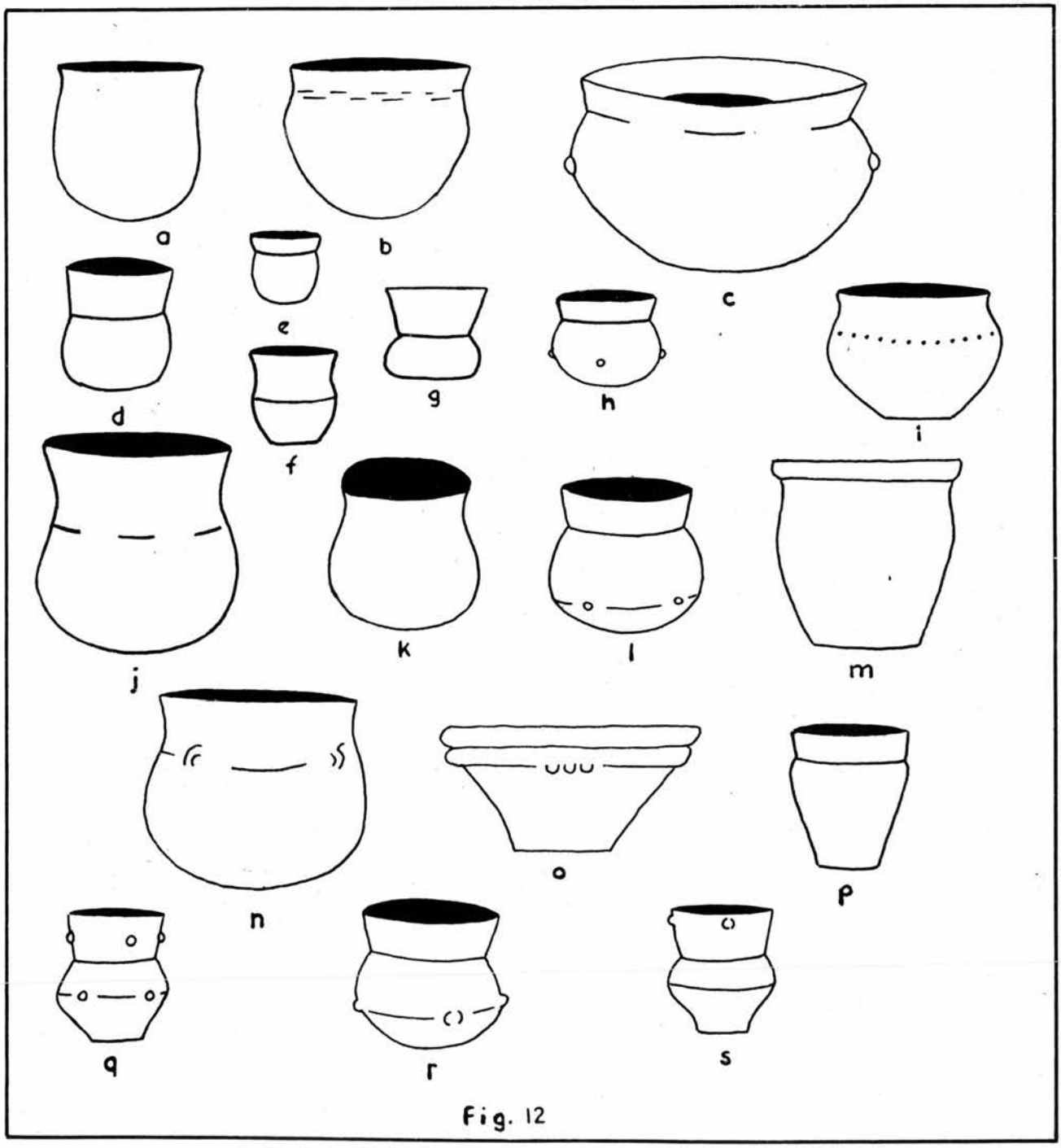


Fig. 12

that collared flasks arose from metal forms at Maikop but has since retracted this (1931, 340 below). Both funnel beakers and collared flasks appeared at Jordansmühl (Seger, 1906, Tab. XII).

At the moor site of Christiansholm in Denmark were found parts of two wooden vessels which may represent forerunners of Funnel Beaker ceramic forms (Jazdzewski, 1932, 81). One is a globular pot whose underpart closely resembles that of a collared flask, and the other has a cylindrical neck and fine vertical strokes on the belly like those on funnel beakers and amphorae (Fig. A and B in Jazdzewski).

Polygonal axes almost certainly were derived from Near Eastern metal forms. The Danubian rectangular house appears at Barkaer and Troldebjerg. It has been suggested that perhaps the Funnel Beaker long barrows were derived from the long rectangular or trapezoidal houses of the Danubians (Childe, 1949, 135).

Mildenberger (1953, 85) believes the acculturation of Mesolithic people by the Danubians is supported by the fact that the disappearance of the Danubians and emergence of the Funnel Beaker people coincide rather closely chronologically.

Fig. 13. Neolithic amphorae.

a, d, e, j, m. Baalberg
b. Danish Early Neolithic B
c. Theiss
f. Vinča C
g. Danish Early Neolithic A
h. Vinča B_1
i. Danubian
k. Macedonian Late Neolithic
l. Kirilovo-Veselinovo (Thrace)

(After Grimm, 1937; Becker, 1948; v. Tompa, BRGK 1934-35; Milojčić, 1949; Schroller, 1933.)

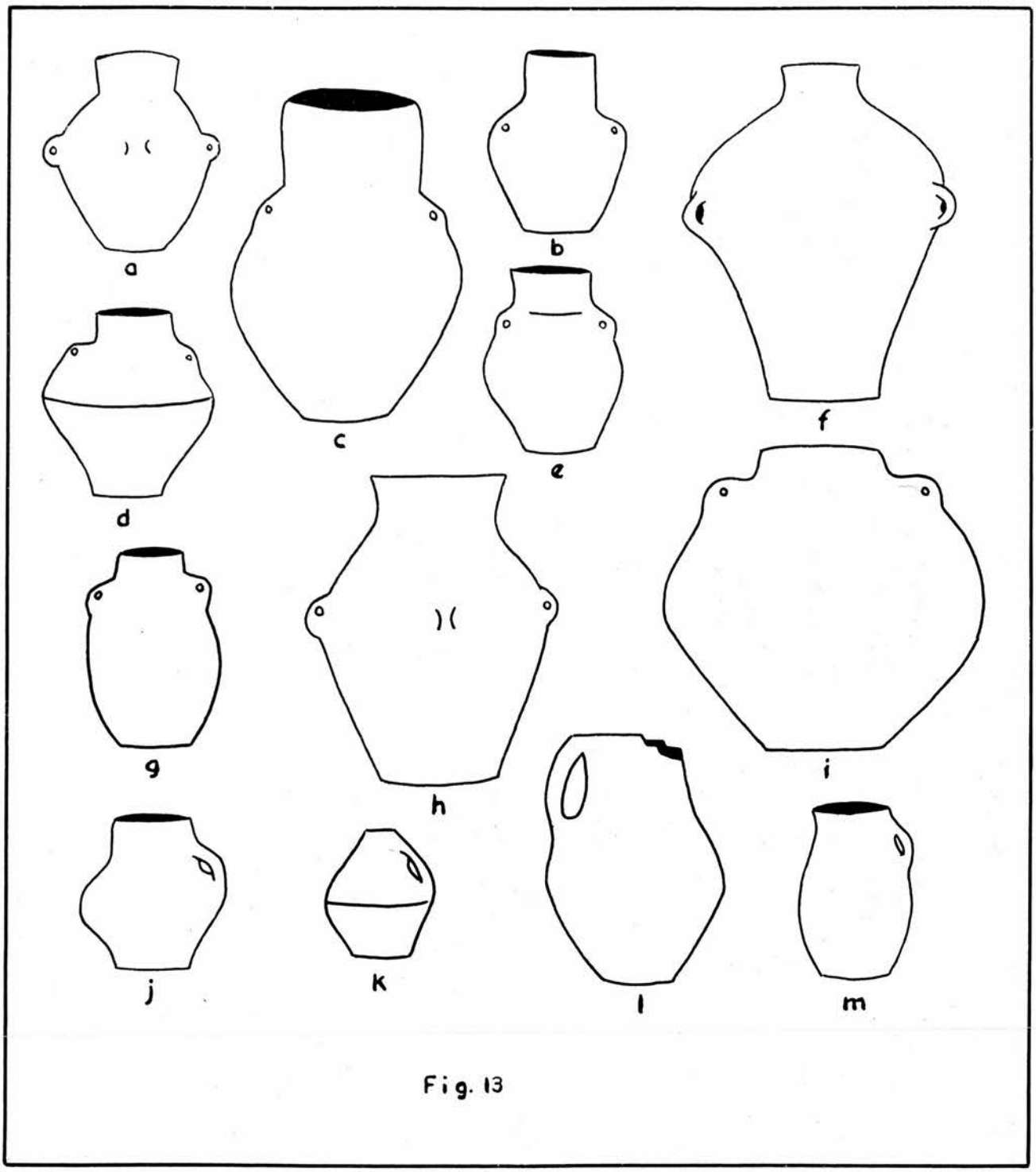


Fig. 13

It seems that the first two hypotheses may be justifiably discarded. Neither an indigenous Danish Neolithic nor the Western Neolithic can fulfill all requirements on the basis of existing evidence. Clearly the foundations lie on the Continent and probably in more than one culture. Certain influences appear to be of Danubian origin and others of more easterly origin. The polygonal battleaxes in particular have no prototypes in the original Danubian cultures. Still other traits must be seen as essentially Mesolithic and probably represent elements retained from the original cultures of the Baltic. The acculturation must have taken place somewhere in north central Europe, for none of the Funnel Beaker groups seems significantly older than the others.

The coexistence of Ertebølle and Neolithic cultures is stratigraphically demonstrated at the Siretorp dwelling-place in Blekinge (Bagge and Kjellmark, 1939). The first and third horizons belong to Becker's non-megalithic Bornholm-South Swedish Funnel Beaker group of Period C, which Bagge and Kjellmark refer to as "Cord-Ware," while the intermediate level was that of an Ertebølle occupation. Both Ertebølle and Funnel Beaker ("Cord-Ware") occupations were succeeded by Pit-Ware. Although the Ertebølle and Funnel Beaker groups had many traits in common, their pottery was distinctly different. Scattered Boat-Axe material in the Pit-Ware stratum showed these two cultures were contemporary (second half of the Middle Neolithic).

Implements at Siretorp were made of both flint and stone. Large, well-made flint blades occasionally occurred in all levels.

Made on blades were knives, scrapers, tanged arrowheads, three-sided arrowheads (some of which had a concave base), transverse arrowheads, and angle and medial burins. Particularly in the Pit-Ware stratum the transverse points were "atypical" (made on various sorts of flakes). The appearance of concave-based points in the same level suggests Pit-Ware colonization ran on into the Late Neolithic. Oblique transverse points were most common in the Funnel Beaker horizons.

In the Pit-Ware stratum there were a few thick-butted greenstone axes, some with rounded cross-section. Only one thin-butted axe appeared. There was also one transverse stone chisel. Of the flint axes most were thick-butted, but a few thin-butted axes were found.

In the Funnel Beaker strata were some four-sided greenstone axes which seem to be transitional thin- and thick-butted axes. The remaining greenstone axes all belonged to the Limhamn type, flaked and polished with a more or less pointed-oval cross-section. The best of these resembled pointed-butted flint axes with oval cross-section, although others had a roughly rectangular cross-section. Flint axes were chiefly represented by fragments of thin-butted axes, but thick-butted types were present. The Ertebølle stratum had only greenstone Limhamn-type axes.

In all strata there were grindstones or whetstones of granite, quartzite, and greenstone. In the Pit-Ware stratum were clubs or phalli of granite or beach pebbles. In both Funnel Beaker and Pit-Ware strata were found needle-whetstones and shaft-straighteners,

and in the same strata were several pieces of polished slate. In the Pit-Ware occupation level uniserially and biserially barbed harpoons made on mammal ribs strongly resemble Maglemosian types. A chisel fragment, awls, and fishhooks of bone also were found. Various artifacts of fired clay appeared in the Pit-Ware stratum: miniature double-edged axes, small discs with radiating lines (sun symbols?), decorated pellets (unperforated), fragments of human (?) and animal figurines, beads, and part of a spoon handle. One piece of amber in the same stratum represented a shafthole axe, and another an axe of unresolved form. In addition, there were tubular beads of bone and dentalium.

About 41% of the 22,000 sherds of pit-ware were decorated. Ceramic forms included a vase with pointed bottom (recalling Ertebølle pots) and a few flat-based pots with partly projecting rim (which may have belonged instead to a Beaker group). The vases varied considerably in size but generally had rather wide mouths. Combed ornamentation occurred commonly and pit-impressions appeared on almost all the vessels, while twisted cord impressions were very rare. Of the decorated sherds, about half had pit decoration only. Stroke-ornamented wares came to about 27%, comb-stamp wares to 20%. Round clay covers and approximately 40 miniature pit-ware vases occurred in addition to straight or S-profile beakers and some vases of Boat-Axe type.

Funnel Beaker pottery was represented by 3500 sherds, 14% of which were decorated. The usual vessel forms were either rather

large beakers with decoration just below the rim (accounting for the small number of decorated sherds) or collared flasks. Ornamentation consisted of twisted cord, pits, and, in two cases, "stab-and-drag" decoration.

Of about 200 Ertebølle sherds, all were undecorated.

Bone material from Siretorp shows that, as on many dwelling-places of the Scandinavian Peninsula, hunting was at least as important as agriculture. Seal accounted for 84% of the faunal remains, while swine (5.6%) and cattle (5%) obviously were of much less significance in the economy. Clark (1946) has discussed the emphasis placed upon seal-hunting in Scandinavia from the Stone Age until historic times. Making up the remaining 5% or so of the bones were sheep or goat, deer, hare, marten, wildcat, and white-tailed eagle. The eagles probably were killed for their tail feathers, which would have been used for fletching arrows (Clark, 1948b, 127-8). The extremely sparse occurrence of fish bones is most surprising in view of the fact that fishing must have been of some importance.

The Middle Neolithic, or Passage Grave, period began with the spread of passage graves of Atlantic derivation. Collared flasks, lugged flasks, and lugged jars disappeared, but funnel beakers continued. Central European influences are to be seen in the form of sharply angular vessels, pedestalled bowls, socketed ladles, and basket-like vases. Polygonal battleaxes and tongued clubheads gave way to shaftholed stone battleaxes with symmetrical upper and lower sides, not all of which were "double-edged battleaxes" (Glob,

1948, 96). Mesolithic flake axes and transverse points were still used to some extent. Other implements were chisels, thick-butted axes, pointed-butted adzes, disc-shaped maceheads, and a variety of bone tools (chisels, knives, points, ladles). Amber ornaments often took the form of miniature axes.

In the Early Neolithic the necks of vessels were small, bodies rounded, and necks and bellies sharply differentiated from one another. In the transition from Dolmen to Passage Grave ceramics the necks became shorter and wider and the profiles smoother. During the early Passage-Grave period we are confronted with a new form which was the starting point for a great part of later Megalithic ceramics. This is Sophus Müller's "Grand Style"—angular pots with horizontal rather than vertical decoration, which reflect Central European influences. Later in the Passage Grave period the profiles again became gentler, and with the return to this profile vertical patterns gained ground again (Nordman, 1935, 34).

It has been established that there were two ceramic traditions among the people building passage graves, one the richly decorated pottery appearing in the graves and the other a simpler type decorated with horizontal rows of pits at the mouth and vertical lines on the belly. The second type was utility ware and a direct continuation of similar Dolmen pottery (Bagge and Kaelas, 1950, 26).

Mathiassen (1944), feeling the settlements of the Passage Grave period offer a clearer chronology than the graves themselves,

set up five Passage Grave subdivisions based on Danish settlement sites: Troldebjerg, Blandebjerg, Trolleborg, Bundsø, and Lindø.

Troldebjerg is directly associated with the Dolmen Period by its thin-butted axes, discoid knives, funnel beakers, and cord ornament but is shown to be early Passage Grave by battleaxes, chisels, footed bowls, socketed ladles, clay spoons, and rich ornamentation (Cardium and stamp). Cord ornamentation is rather common. The pedestalled bowls and socketed ladles seem referable to Lengyel (Eastern Danubian) influence in the last analysis (Childe, 1948b, 58). At Troldebjerg were a number of polygonal huts and a continuous row of rectangular houses under one gabled roof. These last were multi-family ("clan") dwellings (Childe, 1951, 183). There definitely were not two separate occupations (Mathiassen, 1944, 89).

Blandebjerg is much like Troldebjerg but seems to have been later, for there are few "Dolmen" goods. Discoid knives have disappeared. Funnel beakers are relatively rare and cord impression declining. In this phase appeared the transitional (thin butt-thick butt) "Blandebjerg" axes. There is one fragment of a pointed-butted adze. Battleaxes are represented by one of the broad forms called "Fredsgaarde" at Troldebjerg. Vessels with a sharp-angled profile dominate and can be traced to Walternienburg influence. Deep-stroke ornamentation is typical. On the whole, decoration is reduced in quality and quantity.

Trelleborg is obviously later than Blandebjerg, having all thick-butted flint axes (thin-butted greenstone axes were used throughout the Middle Neolithic). No battleaxes are present. Pots still have sharp angles, but are degenerate in shape and ornamentation.

Bundsø (Mathiassen, 1939) is characterized by thick-butted flint axes, discoid maces, two-edged battleaxes, and different pottery with little decoration. Ordinary ceramic forms are bowls with or without a slight belly angle and biconical vases without a shoulder. Bundsø, late as it was, still retained a good cross-section of Mesolithic implement types, including handles, a pick, hammers, and chisels of antler, ulna daggers, bone awls, transverse arrowheads, and core and flake axes (Fig. 14). However, the faunal evidence shows that the economy was not greatly affected; of 10,000 bone fragments only 200, or 2%, belonged to wild fauna. Deer accounted for half this total, with elk, aurochs, Greenland seal, bear, and wild swine making up the balance. Among the domestic animals, cattle were predominant, with swine second in number. Both the overwhelming dominance of domestic fauna and low percentage of sheep and goats are typical of the Danish Neolithic throughout.

Fig. 14. Mesolithic artifacts of the Passage Grave Period.

a-e, g, h, l, m. Danish Passage Grave (Bundsø)
f, k. Polish Funnel Beaker
i, n. North German Passage Grave
j, o. Central German Passage Grave (Walternienburg)

(After Mathiassen, 1939; Jazdzewski, 1936; Sprockhoff, 1938.)

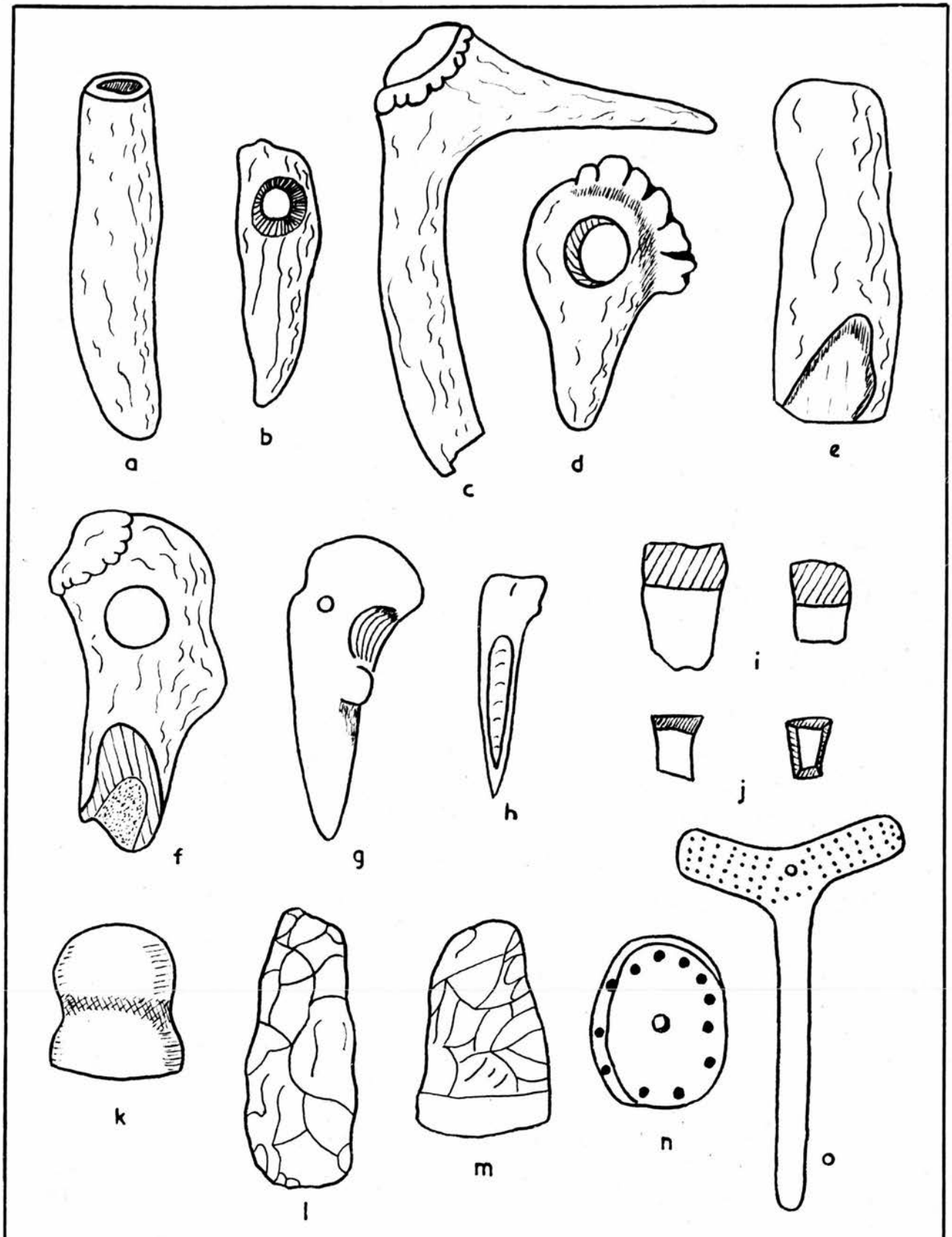


Fig. 14

Lindø also has thick-butted axes and two-edged battleaxes but no discoid maces. The pottery is typified by simple bowls and jars; new are small "suspension vessels." There is about the same amount of decoration as in the previous phase, but it is coarser.

Some artifacts, such as thin-butted greenstone axes, rectangular flint chisels, borers and scrapers, flake knives, transverse points, ulna daggers, and bone chisels, continue through the whole period. For some reason, a number of typical Passage Grave forms do not occur on any of the type-sites. Among these are tanged points, tooth beads, bone pendants, and amber beads. Core and flake axes, microliths, antler axes and picks, bone daggers and chisels, transverse points, bone pendants, are forms still retained from the indigenous Baltic Mesolithic. Pit-decorated bone and amber ornaments (Fig. 14: n, o) are typical of both Denmark and Germany.

Mathiassen believes that these five sites cover the whole Passage Grave Period and that each site covers an independent phase. However, Bagge and Kaelas (1950, 36) have decided two such similar complexes as Blandebjerg and Trelleborg do not represent separate subdivisions and combine the two. They also do not agree that each phase was of equal length and suggest, for example, that Troldebjerg covered a somewhat longer period. In addition, the Troldebjerg phase can be divided into two sub-groups: Troldebjerg and Klintebakken (after a new site in Langeland). The oldest passage graves began during Ib (Klintebakken); therefore, Troldebjerg

belongs to the earliest Middle Neolithic preceding the building of passage graves (Bagge and Kaelas, 1952, 9-10). According to this, then, the beginning of the Middle Neolithic and the Passage Grave Period were not simultaneous. Knöll (1954a, 45) goes even further and advocates a single "Late Dolmen-Early Passage Grave" Period with corresponding grave goods. However, the differences between Early Neolithic C and Troldebjerg material seem sufficient to justify a division.

The passage graves themselves seem not to have developed from the dolmens of the Early Neolithic, which were not meant to be collective tombs. These multi-burial graves are most common in Denmark and south Sweden but were built in Holland and in Germany even as far inland as Saxo-Thuringia. Influences from the Paris Basin appear to account for some North German and Dutch Megalithic features (Nordman, 1935, 83).

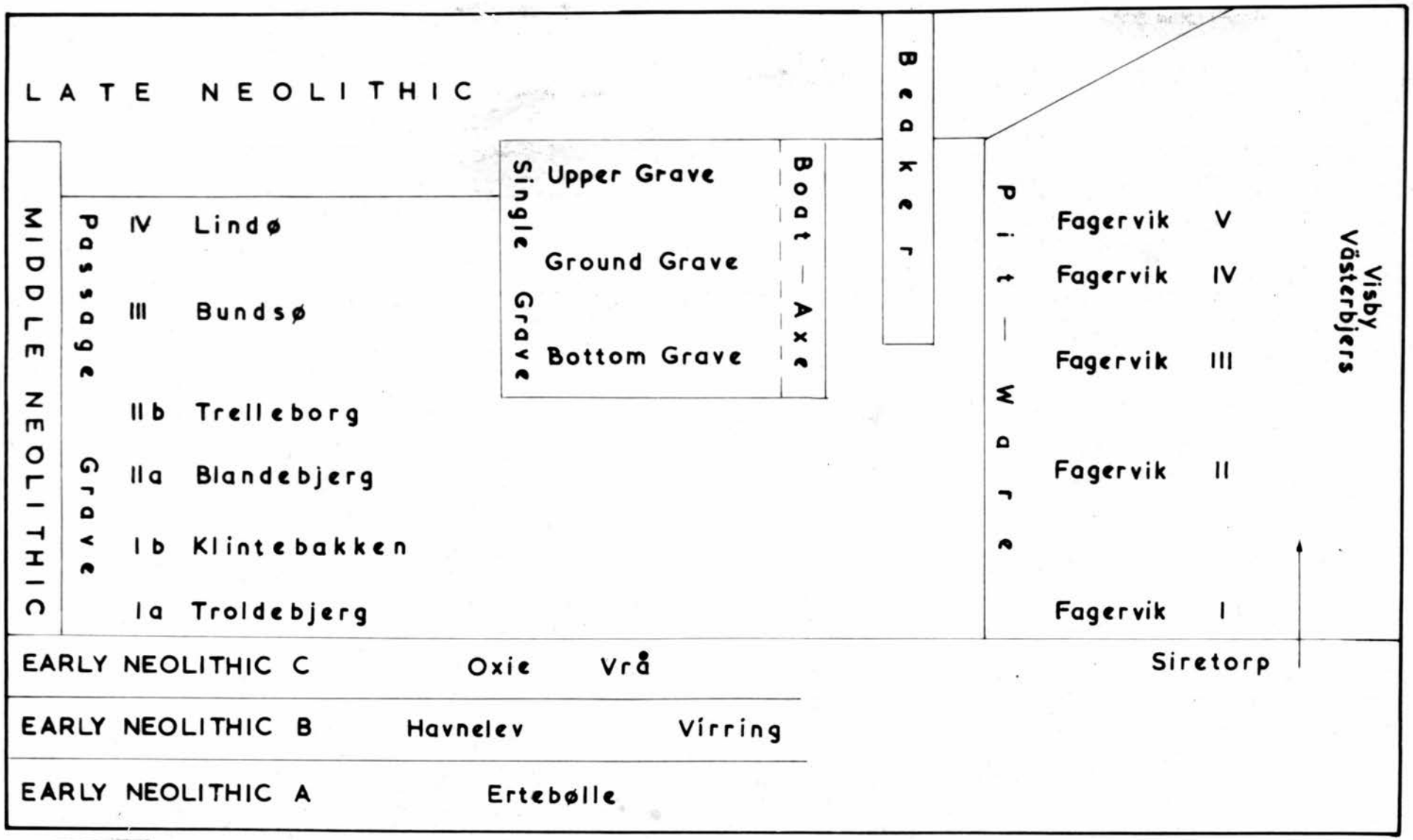
The earliest passage graves are characterized by a polygonal chamber and a long passage covered by a round barrow. Later, the chamber is elongated at right angles to the passage (Daniel's "T-passage grave"). Occasionally tombs contain up to 100 skeletons. In some cases, earlier burials were taken out and reburied to make room for new interments.

The Passage Grave Period probably fell within Danubian III - IV (though some Danubian II types were present in the earlier part of the period) and was no earlier than the Los Millares phase of the Iberian Chalcolithic (Childe, 1951, 186).

Trade in flint and amber was of sufficient magnitude to enable Scandinavian passage grave builders to obtain metal implements and ornaments. The Bygholm hoard in Jutland (Reinecke, 1930), consisting of four flat axes, a dagger, and two spiral armbands, is placed at the beginning of the period.

Material from the older passage graves is found all over Denmark, but the later types are mostly from east Jutland and the islands because of the Single Grave intrusion later in the period (Glob, 1948, 89). The emphasis upon weapons may reflect the strife caused by this "invasion" (Childe, 1951, 185).

Particularly during the early Passage Grave Period the Danubian culture-area contributed to Denmark's Neolithic (Glob, 1939). Danubian "shoe-last celts" occur either with or without shaftholes. Those with shaftholes are divided into two types, one of which has a shafthole running parallel to the blade edge and the other (a flat type) has the perforation perpendicular to the edge. Both types are known in Denmark and Sweden. One example of the celt with perpendicular perforation was found at Holmegaard, which confuses the chronology, but Childe (1948a, 43) describes this as being percussion-perforated in the Mesolithic manner. Glob produces a fairly convincing argument that some of the perforated celts were used as plowshares, based primarily on the fact that a number of the celts have off-center shaftholes with obvious signs of wearing on one side of the implement (Glob, 1939, Fig. 8).



SCANDINAVIAN NEOLITHIC SEQUENCE

As yet no actual Bandkeramik pottery has been found in Denmark, although Glob sees similarities between Danubian ware (such as Rössen) and the earliest pottery from dolmens and kitchen middens. Although Childe (1948a, 43) finds many of Glob's ceramic comparisons not entirely convincing, the socketed ladles and pedestalled bowls, disc-shaped maceheads, and rectangular houses of the Middle Neolithic probably represent Danubian influences. Pedestalled bowls, accompanied by socketed ladles, are typical of the first two Passage Grave periods in northwest Germany, Denmark, and Scania. Schwabedissen (1953, 58) thinks the pedestalled bowls are more likely to have arrived in northwest Europe via east German Stichbandkeramik than via Jordansmühl, as is usually postulated. These vessels eventually should offer a valuable means of cross-dating with the Continent, but they occur so commonly in Danubian cultures it is difficult to determine the exact origin of the Nordic ones.

Within Central Europe the three most important cultures of the Northern Funnel Beaker subdivision are Baalberg, Salzmünde, and Walternienburg-Bernburg. Only the first was contemporary with late Danubian cultures like Rössen and Jordansmühl. Previously, a great deal of weight has been given Alttiefstichkeramik, or Altmegalith-keramik, as the earliest (pre-Baalberg) Funnel Beaker ware in Germany. Grimm (1940), for example, associated it with Linearbandkeramik. Such antiquity is no longer feasible; it was probably contemporary with Salzmünde and Walternienburg, or the first half of the Passage Grave Period in the Scandinavian chronology (Becker, 1948).

Found in central Germany primarily, Baalberg corresponds to Becker's Early Neolithic C in Scandinavia. Ceramics include undecorated amphorae with two handles on the neck or four on the belly, funnel beakers, handled cups ("funnel bowls"), and jugs (Kannen). According to Grimm (1937, 158), the earliest pottery is characterized by angular construction and lack of ornament, but Knöll (1954b, 48) thinks it logical that if there is to be a division between angular and rounded profiles the former would be later (resulting from southern influences). When ornamentation occurs it is in the form of different types of molding hanging from the handles, shoulder, or neck, a type of decoration well known in Scandinavian pottery. Incised designs are almost entirely absent.

Grimm (1937) produced a four-part division of Baalberg, beginning in the early Neolithic and continuing until the Bronze Age. However, since Baalberg is never superimposed upon Salzmünde, Walternienburg-Bernburg, or Globular Amphorae it proves to have had a shorter duration than was supposed (Mildenberger, 1953, 49).

Burials are usually found in flat earth-graves and are always acutely flexed. Stone cists were also in use and sometimes surrounded by a peristalith. Around one cist at Pohlsberg was a trapezoidal outline of stones (Grimm, 1937, 165) recalling similar construction in the Kujavian tombs (Jazdzewski, 1936; Chmielewski, 1952). Grave goods are sparse, usually being limited to a single clay vessel. Settlement burials often contain animal bones and implements as well as sherds, but many of these have to be assigned to

Salzmünde as well. On one site cannibalism is indicated by a pit full of partially burned bones, including a disarticulated human skeleton (Fischer, 1956, 53). In mounds and cists angular-profiled pots are more prevalent than in earth-graves (Knöll, 1954b, 43), suggesting that earth-graves and S-profiled pottery are earlier.

Over 50 Baalberg sites are known in Czechoslovakia, where the pottery has more accentuated profiles and more plastic decoration. Zapotocky (1956) believes some of the Baalberg ceramic forms evolved from Moravian Painted Ware and perhaps had some Rössen associations as well.

Relatively few settlements can be assigned to Baalberg. House types are as yet undefined, although rectangular and sub-rectangular house foundations appeared at Hutberg, a fortified settlement which contained some Baalberg elements (Benesch, 1941).

Very little can be said regarding Baalberg implements, for there are very few definite artifact associations. For that matter neither the ceramics nor burial practices are typical of Baalberg alone.

Becker (1948) has suggested that Baalberg lay at the root of Salzmünde development, which then continued into Walternienburg-Bernburg. This is supported by Mildenberger's recent (1953) publication of material in central German barrows.

Salzmünde is less prolifically represented in German barrows than Baalberg and appears to be later in time. Salzmünde vessels include handled cups and funnel bowls (both relatively rare), handled

jugs (Opperschöner Kannen), amphorae, and pedestalled bowls, among which angular profiles are still the rule. The source of such angularity must be the Eastern Danubian group, perhaps Jordansmühl. Decoration is much more prevalent. Deep-stroke ornamentation now prevailed, relating Salzmünde to the Baltic (Grimm, 1938, 7) and Rössen. Also, an emphasis upon vertical patterns is seen in Salzmünde ware, as in Scandinavian Early Neolithic ceramics. Stamp impressions sometimes appear between linear patterns. Zigzags, hanging triangles, punctate impressions, and cross-hatching are common motifs. In both Baalberg and Salzmünde occurs a more coarse utility ware, which frequently has fingertip impressions under the rim.

Not very many implements are associated with Salzmünde finds. Small flint implements consist mostly of blades and scrapers. A few pointed-butted flint axes with pointed-oval cross-section are known, while in both Salzmünde and Walternienburg are axes of Wieda slate with rectangular cross-section. At the Salzmünde site itself were some clay spinning whorls and longitudinally bored net-sinkers (?).

Both settlement graves and stone cist burials have been assigned to Salzmünde. The settlement burials are often in refuse pits without any real grave goods, recalling Mesolithic practices (Ibid., 25). As in Baalberg, bodies are usually flexed, although some settlement burials are extended.

Hilltop "forts" occur in both Salzmünde and Walternienburg-Bernburg. Such sites with Salzmünde occupations include Goldberg, Hutberg, Oberwerschen, Salzmünde, and Kahlenberg. Jazdzewski (1936,

381) describes similar sites in the South Funnel Beaker group, especially on the Upper Bug in Poland. Irregular four-sided houses are attributed to Salzmünde by Grimm (1938, Fig. 10-11).

Walternienburg-Bernburg followed Salzmünde and was at least partially derived from the latter, although Knöll (1954a, 44-50) feels Alttiefstichkeramik of northwest Germany and Holland was ancestral. Walternienburg-Bernburg is placed in middle Passage Grave time (Mildenberger, 1953, 92).

The culture is best known from a variety of graves, including simple earth-graves (some with stone paving), cists of flat stones (the most frequent form), and in Huns' Beds (early passage graves). The stone cists often were built for several interments. Stone graves are found along the middle Elbe, in the whole Saale region, in Altmark and Braunschweig, and in Saxo-Thuringia. Flat graves prevail east of the Elbe in Jerichow and Havelland. The differences are probably due more to the presence or absence of suitable stone than to anything else (Sprockhoff, 1938, 107). In Walternienburg, both flexed and extended burials may occur in the same grave.

The ceramics are divided into five phases: Walternienburg I - II and Bernburg I - III. WI is made up of "suspension" vessels (Hängegefässe), handled cups, and bowls, all of which continue the angular tradition. In WII there are cylindrical vessels, round-bottomed bowls, and double cups. Neck and body are less noticeably separate, and angularity is reduced. In BI the "hanging" vessels degenerate; pointed-oval bowls and double cups disappear. Pots have

a double-conical profile. In BII the double vessels appear again. Ceramics are typified by large, broad handles and funnel-shaped necks on the bowls. In BIII only a very slight neck-body division is to be seen. Less well defined are other types of pottery, such as covered vessels, large storage vessels, and basket forms.

Mildenberger (1953, 51) notes that collared flasks may be assigned to Baalberg, Salzmünde, and Walternienburg-Bernburg. They were not often used as grave goods, and due to the relatively few Funnel Beaker settlements, it is not surprising that only a small number of flasks have been found.

It is to be emphasized that the Walternienburg-Bernburg divisions are typological, not chronological. For this reason, different phases are often stratigraphically associated. Mildenberger (Ibid., 57) feels a more justifiable division would be WI/WII and BII/BIII, with BI and part of WII seen as a mixture.

WI ceramics are not usually represented in graves. Where WII/BI or BII/BIII occur, they prove to be later than Baalberg. Time relationships with Salzmünde are not so clear, but the evidence suggests the latter was earlier. Walternienburg-Bernburg antedated and overlapped both Cord-Ware and Globular Amphorae.

After Early Neolithic C in Denmark, Megalithic influences began to have their effect. These new influences soon spread all over the northwest Funnel Beaker area from Central Germany to Central Sweden, splitting the previously homogeneous Funnel Beaker cultures into a northern megalithic culture-area and a non-megalithic

East German-Polish culture-area. In Central Germany this change is first reflected in Walternienburg-Bernburg.

Bernburg shows considerable Danubian influence as well as Nordic. At about this time the transition from Lengyel-Jordansmühl to Baden was taking place, and Baden has a number of characteristics in common with Bernburg. Bernburg potters had a predilection for bosses, ribbing, and scalloping as in late Danubian. Rippled rims are known in both Bükk and Rössen (Mildenberger, 1953, 60). The Central German high-projecting handles are also related to late Danubian ceramic styles, such as that of Baden.

According to Sprockhoff (1938), implement types are hard to pin down. Characteristic are axes of Wieda slate (Wieda lies in south Harz, outside of or on the edge of Walternienburg-Bernburg settlement) and transverse arrowheads. Among amber ornaments are found crescentic beads like those in Megalithic, Single-Grave, and Early Bronze Age graves of Holstein. There are also pit-decorated bone pendants (Fig. 14: o) and black and white beads made of grain seeds and bone. Bone needles imitating copper Aunjetitz types and bone daggers appear. There are also some toothed bone tools and at least one bone fishhook is known. Metal ornaments include finger rings, tubes, and small spirals. Among the ornaments are perforated teeth of deer, bear, and horse, animals which almost certainly must have been hunted for food.

Walternienburg development in Havelland took a special course. The "Havelland culture" is known mostly from graves, and extended

burials in earth-graves predominate. Ordinarily a single pot was interred with the corpse; other grave goods are rare. However, one burial included stone knives, a pointed bone, bored animal teeth, arrowheads, a polished stone axe, a bronze armband, and a piece of conifer resin. In Uckermark, on the edge of the Havelland area, are a few stone cist graves. Cremation has also been observed in Havelland culture.

Pots are small but well made, and the chief forms are close to Walternienburg types. The oldest material corresponds to WI. Geometrically stroked decorations are characteristic of the culture throughout.

Artifact types include thin- or thick-butted axes of Wieda slate, double-edged axes, transverse points, flint knives, metal armbands, decorated bones, bone needles, and bone spinning whorls. Horse, cattle, and deer bones are commonly found with Havelland material, and the perforated teeth of dog, bear, and wildcat were worn as ornaments.

Walternienburg-Bernburg is an extremely difficult culture to define, particularly in view of the fact that information concerning its predecessors, Baalberg and Salzmünde, is so incomplete. A great deal of its content is foreign to Funnel Beaker cultures, and Walternienburg-Bernburg traits are obviously of Mesolithic ancestry. Perhaps the same would be true in the cases of Baalberg and Salzmünde, but we still know too little of their equipment. On the other hand, the Mesolithic portion of Walternienburg-Bernburg may represent a

recrudescence of Mesolithic techniques, similar to that observed in Secondary Neolithic cultures. Such a relationship with Secondary Neolithic cultures seems not altogether impossible, although Walternienburg-Bernburg's place is hard to ascertain.

Western Funnel Beaker

In the region of Holland, northwest Germany, and Denmark appeared the Altmegalithkeramik or Northwest German deep-stroke ware, which in some areas occurs with funnel beakers and collared flasks (Jazdzewski, 1932, 92). To it also belong shouldered vessels (including handled cups), "flowerpot" vessels, and bowls. This ware is characterized by angular profiles and furrowed-stroke ornament, which are lacking in the early Northern group and in the Southern and Eastern groups.

The Western Alttiefstichkeramik is characteristically associated with Huns' Beds—long barrows with rectangular chamber and short passage—and corresponds with the early Passage Grave period in Denmark.

Eastern Funnel Beaker

West Poland was both the geographical and cultural center of the Eastern group. Within this area Jazdzewski (1936) has postulated the existence of an older (Wiórek) and a younger (Lubonier) complex.

The Wiórek sub-division is characterized by funnel beakers with clearly contrasted necks as well as collared flasks and amphorae with double-conical bellies and cylindrical necks. Ornamentation consists primarily of the so-called Leiterornamente, vertically

incised lines in combination with transverse strokes. On some of the amphorae comb-stamped decoration appears. Collared flasks have little or no decoration (and are totally absent in Lubonier). Funnel beakers commonly have handles in the Eastern group, in contrast to Scandinavia. Other ceramic types are pitchers, bowls (funnel-necked), "baggy" pots with a thickened rim, cups, and spoons. Most peculiar are some vessels with perforations in the base, like the "sieves" from Lengyel and Jordansmühl. Spinning whorls of various shapes indicate some sort of textile industry.

In the Lubonier sub-group vessels have a less marked division between body and neck, and funnel beakers end up as bowls. Two- or three-strand cord impressions are the most common form of decoration, while Leiterornamente was not used at all. Amphorae are often ornamented with vertical ribbing or vertical double rows of furrows. There are fewer subordinate pot forms, but pitchers, bowls, spoons, baggy pots, and spinning whorls still occur.

These divisions admittedly are more typological than chronological, and they are weakened by the fact that Wiórek was picked as earliest primarily because of its closer resemblance to the Northern group, which Jazdzewski regarded as ancestral. In addition, he thought the cord-ornament of Lubonier necessarily a later Neolithic form of decoration, but it appears on Becker's type B funnel beakers.

Knobbed hammer-axes and double-edged battleaxes appear in Poland as in Denmark. One example of a stone hollow-edged chisel was found in an East settlement. Grooved stone hammers or pestles with flat bases are common (Fig. 14: k). Thin-butted flint axes with

rectangular cross-section appear, but thick-butted axes are more typical of the Eastern and Southern groups. One thick-butted flint chisel with rectangular cross-section was associated with a Wiórek find. Laurel-leaf flint arrowheads are assigned to Wiórek (similar quartz points appear in Lubonier), but arrowheads are not very common. Flint scrapers, knives, saws, and borers appear frequently, but blades are not numerous and usually are small. Baltic moraine flint was used a good deal, as was the case at Brzesc Kujawski. Antler axes (Fig. 14: f) or sleeves are characteristic of the Eastern group. In a Wiórek moorsettlement were found a wooden dugout and two rudders.

Most of the material comes from dune settlements, but no information has been obtained concerning house types. There are some bog sites which Jazdzewski had originally thought of as being religious in character (cf. Becker 1945, 1948, 1949), and in the Southern group are hilltop "forts" placed on high promontories along river valleys or at river junctions. As we have seen, such sites are also attributable to other Central European Funnel Beaker cultures.

Little is known of crop types or agricultural techniques, although the use of animal representations in the ceramics may indicate herding was relatively important.

In one Wiórek grave was a copper ring. This apparently is the only metal which has been associated with Funnel Beaker cultures in Poland.

From Denmark to Poland are found non-megalithic graves in which one or more corpses were extended on the ground within an enclosure of loose boulders (which was sometimes covered by a mound). In Poland, these are called Kujavian tombs and are not to be considered megalithic structures. They originally were thought to have been erected by Globular Amphorae people as well as, or instead of, Funnel Beaker people, but it is now clear that the Globular Amphorae burials were secondary (Chmielewski, 1952, 105). There are variations in the type of burial, but most bodies were placed in a pit surrounded by rocks. The skeletons are extended with their heads usually grouped around the central part. Grave goods are relatively sparse. The ring of boulders encircling the mound is either trapezoidal or triangular in shape, but both Chmielewski and Jazdzewski are convinced the former were originally triangular, the apex having been removed during the course of time.

Regarding the Kujavian tombs, Chmielewski shows that all are on river drainages or lakes, not on the best pasturage but near it. Neither do they occur in dense groups. He believes they were built by pastoralists, as opposed to other Funnel Beaker groups in Poland who were primarily agriculturalists and/or flint-working specialists.

Southern Funnel Beaker

The Southern Funnel Beaker area stretched from the Harz along the Sudeten mountains and north of the Carpathians to the eastern border of Poland. Naturally on such rugged terrain a number of local groups appeared, and these in turn were influenced by different

cultures. The South Group acted as a filter between the Eastern group and southern Neolithic cultures, which may explain the relative purity of the Eastern culture. Jazdzewski confines his investigations to the Polish sub-group.

Funnel beakers characteristically have a short, inturned rim, a clearly divided neck, and a body about three times the height of the neck. These occasionally attain huge proportions, sometimes as much as 68 centimeters. Very often they have angular lugs or handles. Decoration usually is confined to the outer rim; comb-stamps, furrowed strokes, incised lines, or cord impressions serve as ornamentation. Collared flasks are increased at the neck at the expense of the body, which was also a tendency in the Eastern group, and some have handles on the neck. In the great variety of amphorae there is a noticeable sparsity of decoration. There are also pitchers, bowls, baggy pots, spoons, spinning whorls, animal figurines, and one example of a perforated vessel. Zoomorphic handles and decoration in the Southern group point to southern influences.

Jazdzewski (1936) aligns the Eastern and Southern Funnel Beaker cultures with the later manifestations of Danubian culture and at least partly with Globular Amphorae and Cord-Ware. The Southern branch is regarded as contemporary with Baden, earlier than Zlota, and probably later than Stichbandkeramik. A Funnel Beaker group between the Bug and Vistula, which seems to have been derived from the early phase of the Eastern group, shows affinities with the

Moravian Painted Ware culture--zoomorphic handles, drawn-up handles, miniature clay axes, cremation burials, etc. (Gajewski, 1949, 187). The same material lends support to the contemporaneity (at least in a later period) of Globular Amphorae and Cord-Ware cultures with Funnel Beaker culture.

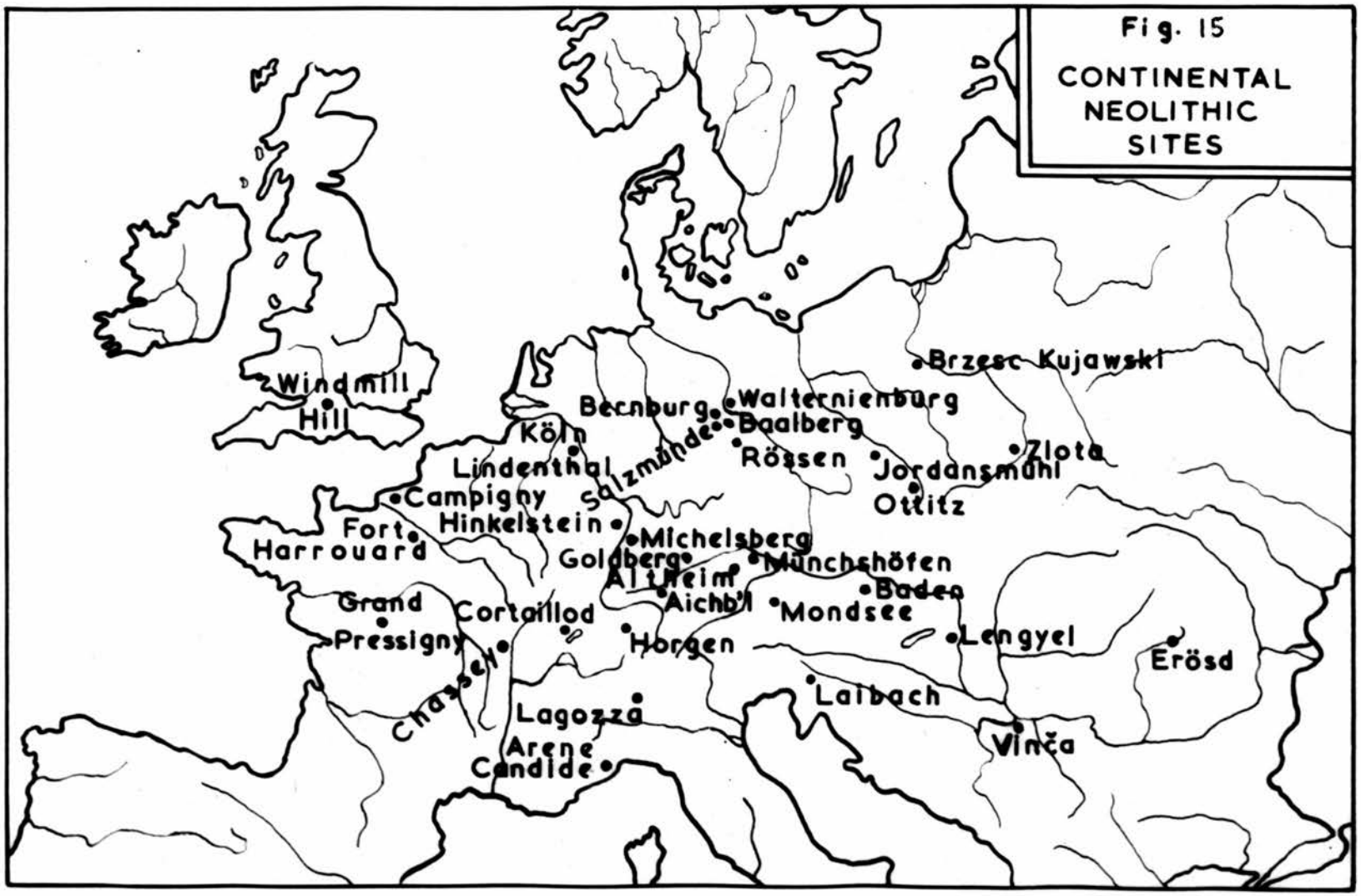


Fig. 15
CONTINENTAL NEOLITHIC SITES
Brzesc Kujawski
Windmill Hill
Becnburg
Walternienburg
Köln
Baalberg
Lindenthal
Salzmünde
Rössen
Zlota
Jordansmühl
Campigny
Ottitz
Hinkelstein
Fort Harrouard
Michelsberg
Goldberg
Münchshöfen
Altheim
Baden
Aichb'l
Grand Pressigny
Cortaillod
Mondsee
Lengyel
Horgen
Erösd
Chassey
Laibach
Lagozza
Vinča
Arene Candide

CHAPTER IX

SECONDARY NEOLITHIC

Campignian

Among those traits distinguishing Secondary Neolithic cultures is the occurrence of a Campignian element of crude picks and tranchet axes. In order to fully understand the Secondary Neolithic cultures in northwestern Europe, it is essential that we carefully re-evaluate the significance of this perplexing Campignian tradition. Although many archaeologists in the past have criticized its recognition as a "culture," Louis-René Nougier's (1950) exhaustive study of the origin and development places Campignian at the fore of contributors to the Western European Neolithic. A brief synopsis of his conclusions will be useful in our treatment of the Campignian problem.

The prototypes of the Campignian picks and axes are found in Maglemose and Komsa-Fosna of Scandinavia, but a south Russian source is postulated for such tools. Upon this beginning the "Pre-Campignian" was based, and two offshoots appeared in Northern Europe: one in Westphalia and Liége, centered at Aubel on the Meuse, and one in Scania, centered at Kyvik near Göteborg. These groups were sedentary hunters using pottery.

The "classic" Campignian is closely related to Ertebølle and Lower Halstow by virtue of the continued use of picks and

tranchet axes, and these people spread into the Paris Basin, where they lived in villages cultivating cereals and raising livestock. Within the Classic Campignian were a number of special groups: forest dwellers, exploiters of the natural reserves of flint and stone, colonists in Britain and Ireland, and pioneers in south-eastern France who came into contact with the lacustrian Neolithic.

The "Post-Campignian" arose out of the contact with the Neolithic lake-dwellers. Hereafter, Campignian craftsmen polished their axes. Sickles and unpolished, discoid maceheads came into use.

By this time Campignian proper was overwhelmed by the Western Neolithic, but the Campignian tradition still survived. During this "Neolithic of Campignian tradition" the flint mines at Spiennes and Grimes Graves were worked, along with less well known mines in northern France. The Seine-Oise-Marne culture is typical of the final phase, the "Chalcolithic of Campignian tradition." The type site is Campigny, from which the whole complex derived its name. At this time, Chassey pottery was added to the ceramic stock, and Grand-Pressigny flint was traded far and wide.

It is difficult to justify this elaborate theorization on the basis of current evidence. The obvious flaw in it is that almost without exception Campignian tools are surface finds—whether they be in Ireland, France, or Russia. Consequently, dates and cultural associations are not always reliable, and in the last analysis our knowledge of Campignian is limited to the heavy flint and stone tools which characterize it.

Campignian can not, therefore, be considered an independent tradition, much less a population which almost single-handedly forged the character of Neolithic Europe. It is rather the survival of Mesolithic techniques which provide only one facet of Neolithic tradition in Western Europe, and the cultures in which th is "Campignian" element is strongest are the Secondary Neolithic groups with their revived Mesolithic heritage. The "Campignian industry" is in fact the common denominator which unites the Secondary Neolithic cultures of Britain, and we are thus justified in discarding the term "Campignian" altogether and substituting "Secondary Neolithic" (Piggott, 1954, 277-8).

The source of the tranchet axes undoubtedly must be traced to the Northern Forest Cultures. There is some evidence that Maglemose, or a related group, penetrated France and Belgium (Clark, 1936, 231 and 237) as well as Britain. Mrs. Hawkes (1934, 26) went so far as to describe Campignian as "a late and poor extension of the Baltic Forest Cultures." In France, the Tardenoisians may have obtained what we know of their heavy industry from Maglemosians, and then transmitted it along with indigenous Tardenoisian types, e.g., the petit tranchet, to the Neolithic cultures of Western Europe. Since Tardenoisian distribution extended to the south shores of the Baltic (Clark, 1936, Fig. 65), there appears to have been a generous overlap with Maglemose, and the microlithic bond between the two groups shows that they almost certainly were in direct contact.

Not all of the "Campignian" types are so easily placed. The outstanding feature of most of them is their crudity, whether they

are attributed to the Mesolithic or the Neolithic-Chalcolithic. Indeed, the rough workmanship on the "Campignian" axes at Grimes Graves led to the assumption that the mine was Palaeolithic (Smith, 1912; Armstrong, 1920, 1923, 1924, 1926), until Clark and Piggott (1933) were able to illustrate conclusively that such mines were in reality Neolithic. In the case of Campignian tools, no typological classification can survive scrutiny, and we may be justified in suspecting that only the best examples are selected for illustrations and museum displays.

There seems to be only one explanation for the widespread distribution of such crude implements at a relatively late date in European prehistory. These tools are not finished artifacts at all but only factory roughouts, or unfinished implements. This assumption appears to be supported by "Campignian" distribution, for as Movius (1942, 211) states: "The bulk of the evidence is from axe factories, workshops, and open air stations." Clark (1936, 161) noted the association of the Campignian tradition with axe mining. The correspondence between Western Continental flint-workings and Campignian distributions (Fig. 16)[1] is almost exact. The extension in southeastern England again coincides with the flint-mining industry. In northeast Ireland the focus of "Campignian settlement" was in Antrim and Down--where the cretaceous chalk contained the best flint (Movius, 1942, 212). In this region later appeared the Secondary Neolithic Bann

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1. After Nougier, 1950. British flint-mine distribution after Clark and Piggott, 1933.

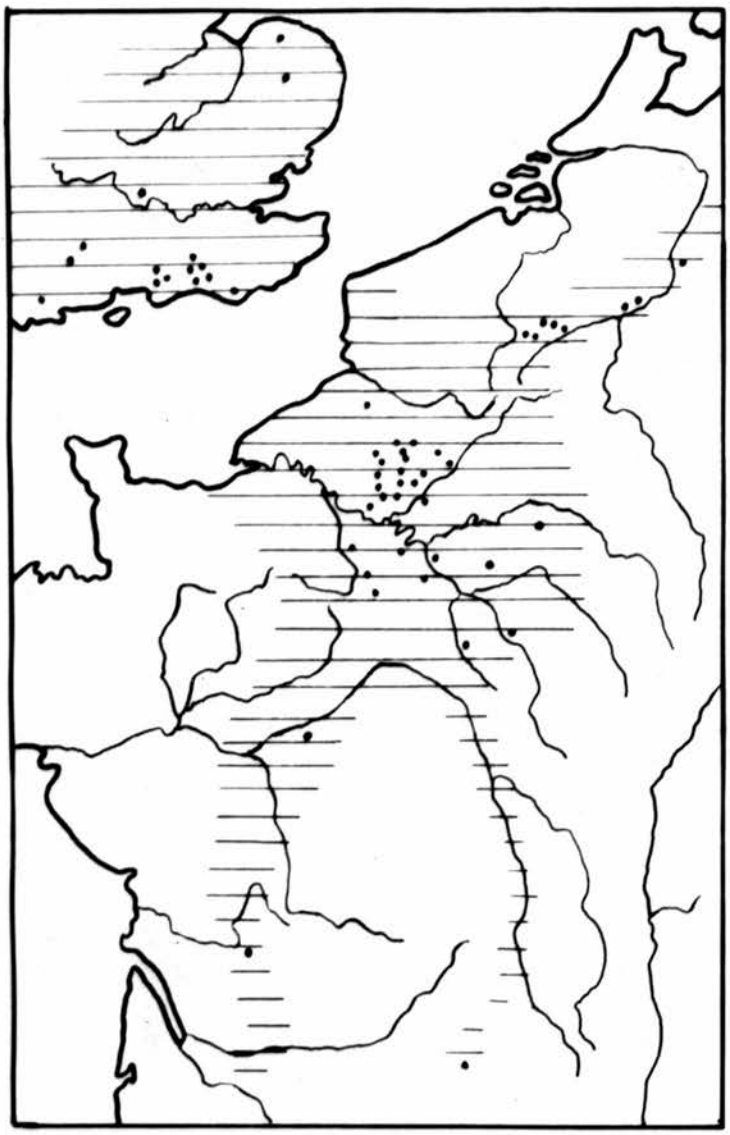

Fig. 16.
DISTRIBUTION OF FLINT MINES AND NEOLITHIC OF CAMPIGNIAN TRADITION.

and Sandhill cultures. The same phenomenon occurs in Wales, as at Graig Lwyd, which is also assumed to be a manifestation of Secondary Neolithic mining activity (Piggott, 1954, 289 ff.). Nougier's Pre-Campignian "Kyvik phase" in Scania, strangely isolated like Ireland from the core of Campignian settlement, is also in an area of flint exploitation.

The fact that not all "Campignian" implements are from quarries and workshops does not negate the argument, because most are surface finds and not in cultural association. It is conceivable that some of them represent trade items, for hoards of flint rough-outs are known elsewhere, and possibly a certain number of them were used as tools, such as flint-picks or hoes, where in the unfinished state they would be perfectly suitable. Schwantes (1932) long ago recognized the fact that Campignian was inseparably tied in with flint-mining and that the primitive appearance of the tools was merely technological convergence resulting in a fortuitous resemblance to Palaeolithic and Mesolithic implements. He thought the use of such crude forms was due to the abundance of flint, in which case there would have been little need to grind and polish the tools. While there may be more than a germ of truth in this, probably most of the tools were never used or meant to be used in that state.

"Campignian" does not involve a flint-working tradition as much as a flint-mining tradition in Western Europe which persisted as long as flint axes were produced.

In Figure 17: 1 - 14 are illustrated a number of Campignian tools from Nougier's text. With the exception of the tranchet (1), none can be acknowledged as finished implements, but all are described as axes or picks.

Some more or less comparable forms are shown in Figure 17: 15 - 24, each of which is a known roughout or reject from North America. One of these (17) had been exhibited as a Palaeolithic implement because of its crude appearance (paralleling the early estimations of Grimes Graves products). W. H. Holmes of the American Bureau of Ethnology made extensive studies in the early part of this century on the association of such forms with mining and quarrying in North America and came to the conclusion that most represented rejects or "blanks" produced in the course of working the freshly mined flint or quartzite. It was Holmes' belief that many of the rejects were cast aside because they were too thick, and this seems to be the case also for some of the Campignian flints (2, 5, 11, and 13).

Fig. 17. Campignian axes and picks.

1–4, 6–10, 12, 13. French Campignian
5. Lower Halstow
11. Spiennes
14. Cissbury
15– 24. American factory rejects

(After Nougier, 1950; Holmes, 1919; 23–4 courtesy of Prof. E. F. Greenman, University of Michigan.)

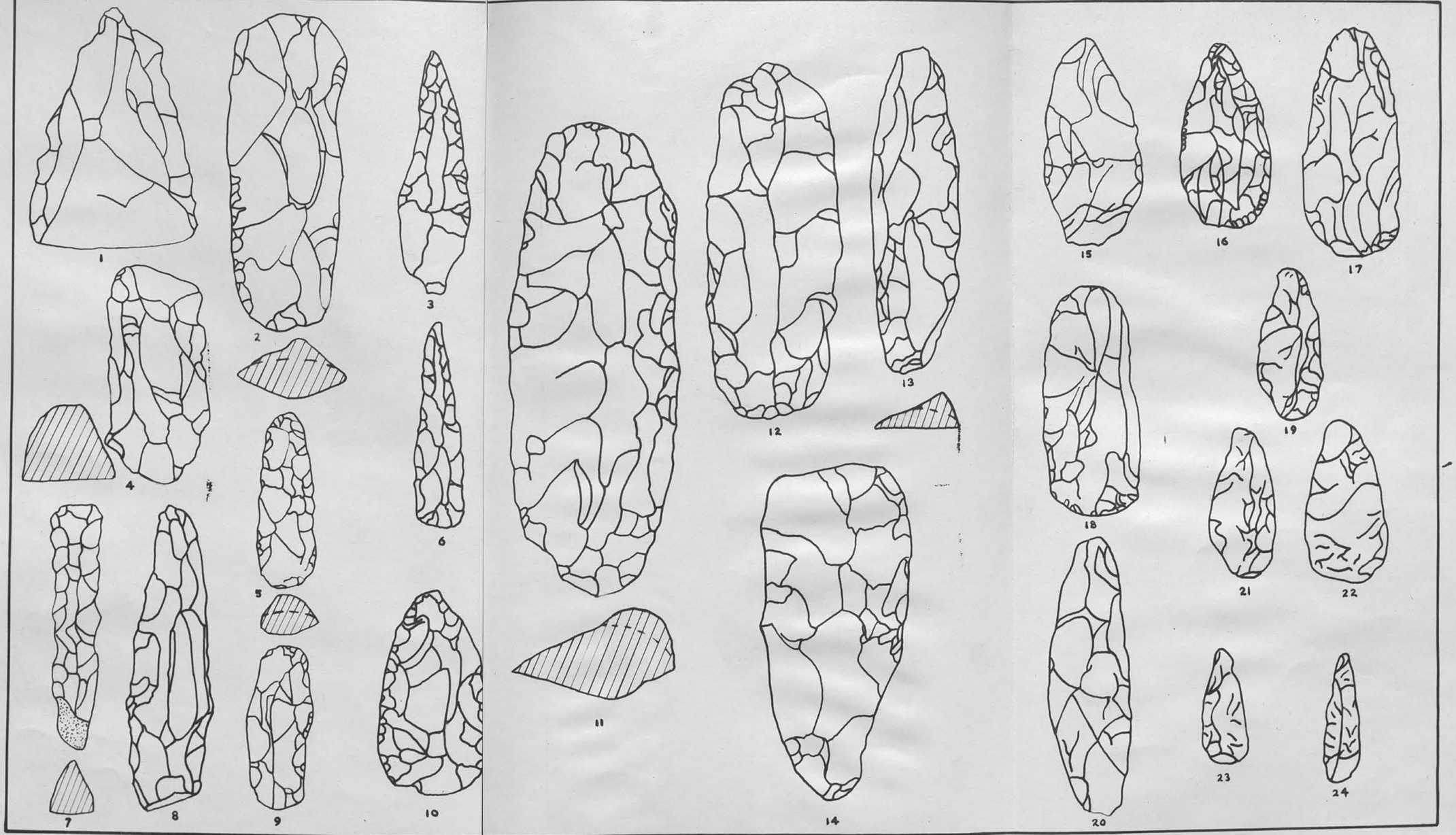

Fig. 17. CAMPIGNIAN AXES AND PICKS

Large blades, choppers, and bifaces have been found in association with relatively recent American Indian cultures, showing that crudeness is not synonymous with antiquity. However, some of these factory "blanks," mostly picks and choppers, although indistinguishable from quarry rejects have unmistakable signs of use (Bryan, 1950, 3-6). Undoubtedly, some of the Campignian picks were also used in or around the flint mines (Fig. 17: 7 may be such a tool, but it is impossible to tell from a drawing).

The artifacts in Figure 17: 23 and 24 are quartzite roughouts, probably for projectile points, from a quarry-workshop at George Lake near Killarney, Ontario, Canada. The Campignian "picks" in Figure 17: 3 and 6 were possibly for the same purpose. Certain other pick-like implements from George Lake are felt by the excavator to be very close to Campignian picks.[1]

Another "Campignian"-American parallel in mining activities is rough flint axes or picks with side-notches for hafting (Nougier, 1950, Figs. 27: 8 and 92: 2; Holmes, 1919, Fig. 86).

With these facts in mind, we may turn to the Secondary Neolithic cultures, beginning with a consideration of the British groups already defined by Professor Piggott.

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1. Correspondence with Prof. E. F. Greenman, University of Michigan.

British Secondary Neolithic

In part contemporary with the Windmill Hill intrusive agriculturalists, but sometimes demonstrably later, are those cultures which Piggott terms Secondary Neolithic. On the whole, the Secondary Neolithic cultures fall in a period preceding the arrival of Beaker people, which conventionally signifies the beginning of the British Bronze Age. Although there is some overlap of these cultures with Western Neolithic cultures in Sussex, Wessex, and northern Scotland, the former are found primarily in eastern Britain and in coastal or riverine sites as opposed to the predominantly upland distribution of the Western group. The essential characteristics uniting these cultures are those whose origins lie in the Northern European Mesolithic.

Pottery provides the basis of differentiation among the Secondary Neolithic cultures. Ceramic degeneration can be seen in all of them, and all contain elements whose origins are mostly of Mesolithic ancestry or form part of the Circumpolar Stone Age Kulturkreis.

Stone material includes the non-Western types in Western Neolithic flint mines and flint-axe factories, as well as a heavy industry of tranchet axes and picks and a light flint industry composed of petit tranchet derivatives (Fig. 18: b), polished knives, single-piece sickles, and possibly small tranchet flake axes. There are also the products of axe factories of igneous rocks with known manufacturing centers in Wales, Westmorland, Northern Ireland, and Cornwall.

Regional groups in the Secondary Neolithic complex include Peterborough of the Thames Valley and southern and eastern England, Bann and Sandhill of Northern Ireland, Rinyo-Clacton ("Grooved ware") of southeast England and the Orkneys (with intermediate sites), Ronaldsway on the Isle of Man, and Dorchester in south and east England.

Peterborough

Vessels are usually coarse, heavy, and round-based with a thickened rim and marked shoulder. Ornament ordinarily falls upon the upper two-thirds of the vessel, especially on the rim and shoulder, and consists of impressed twisted or whipped cord, fingernail impressions, stamped impressions produced with the articular ends of bird or small mammal bones, shell or comb impressions, rows of pits, and herring-bone and crossed-hatched motifs. From the first its similarity with cord ornamented and pit-comb ware of Northern Europe has been recognized. The distribution of Peterborough ware ranges from the Firth of Forth and Galloway in the north to the English Channel in the south, but the focal center is in southern England. In Ireland, Sandhill wares share certain features with Peterborough. Most Peterborough pottery has turned up as stray finds, but in some cases it is in a cultural context. Two vessels belonging to the Mortlake (typical) sub-variety of Peterborough recall Ertebølle bowls, or blubber lamps.

Stone and flint types associated with Peterborough include flint and stone axes, a flint pick, a small tranchet axe,

polished-edge knives and scrapers, single-piece curved sickles, leaf-shaped arrowheads, petit tranchet derivatives, serrated flakes, jet or lignite "belt-sliders," stone balls, and a grain-rubber. All of these are common to Secondary Neolithic cultures as a whole, and many are of Mesolithic ancestry.

Not only the stone types but also the pottery of Peterborough is allied to Scandinavian forms. Pottery at Siretorp is decorated with both pit-comb and cord ornament, and cord ornament occurs on Becker's type B funnel beakers. Pit-comb ware is typical not only of dwelling places in Sweden, Norway, and Finland but extends across the Circumpolar belt to eastern North America as an integral part of the Circumpolar Stone Age. Gjessing (1944, 65) includes Peterborough in this complex, primarily because of the pit-comb elements in Peterborough pottery. The use of pits is more common than comb-stamps, which are replaced by the "bird bone" stamps. It is, however, much more difficult to separate the contributing components in Britain as the cord-marked funnel beaker and pit-comb elements are not as clearly defined. The presence of the funnel beaker element shows Peterborough was not purely a development within the Circumpolar Stone Age. There is some evidence that Peterborough began during Scandinavian Early Neolithic C.

Fig. 18. Mesolithic implement types of the Secondary Neolithic: I.

a, j, k. Seine-Oise-Marne
b, l. British Secondary Neolithic
c, e, g, n, r. Fort-Harrouard
d, h, i, m, o-q, s. Michelsberg
f. Omalian
(After Childe, 1950; Piggott, 1954b; Philippe, 1936; Buttler, 1938; Mazalek, 1954; Schuchardt, 1934.)

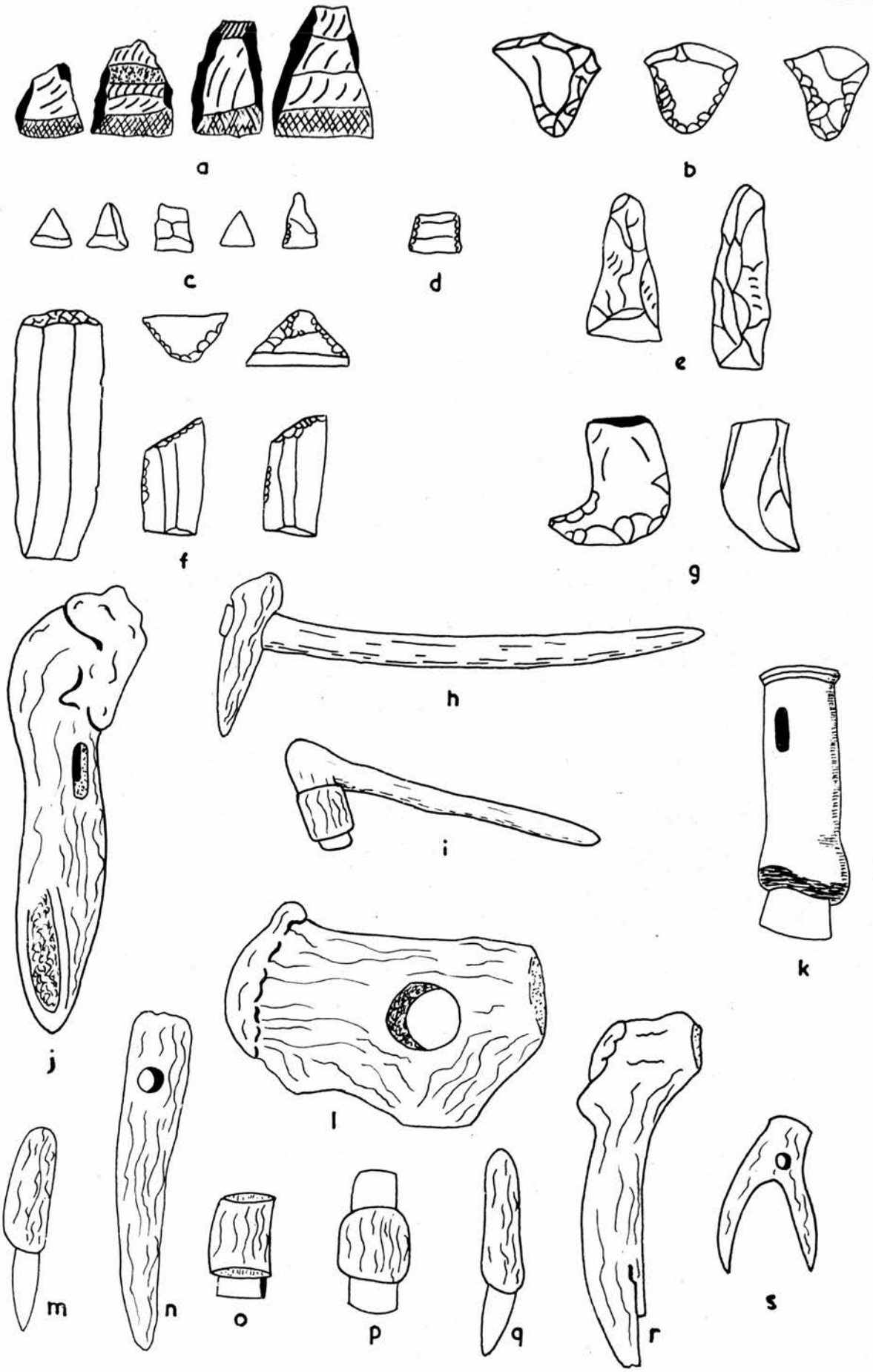

Fig. 18

Bann

The Bann culture arose as a result of Larnian-Neolithic contact in Northern Ireland and although centered on the lower Bann River is found elsewhere in Ireland and on the Isle of Man. The Bann site at Newferry, Co. Londonderry, has been assigned by Jessen to Zone VIIb.

Bann pottery is related to Beacharra and Sandhill. The type implement is the "Bann points," of which there are prototypes in all Larnian levels (Movius, 1953). Other stone types are triangular cross-sectioned fabricators, scrapers, small basalt axes, leaf-shaped lanceheads, bone points, huge stone axes, and two Iberian-type plaques. Whelan (1952) reports curved points and double-pointed gorges of ox bone, which suggest a strong fishing tradition still persisted side by side with stock-raising.

Sandhill

This culture, found on coastal dunes in Northern Ireland, also appears to have developed out of contact between indigenous Mesolithic inhabitants and Neolithic colonists. The group is not well defined, but the pottery has been compared with Peterborough ware, particularly because of the use of cord ornament. There are some features recalling Beacharra C ware, which supports a date for Sandhill late in the Irish Neolithic. Pit-comb affiliations are almost entirely lacking, and "bird bone" stamping is absent. It is likely that Sandhill and Beacharra C ware, which do not have pit-comb ornament, belong to a period of Scandinavian contact somewhat

later than that accounting for Peterborough features, probably the late Dolmen or early Passage Grave period.

Rinyo-Clacton

Rinyo-Clacton ware has a curious north-and-south distribution (Orkneys and southern England), although there are signs of its existence between the two extremes. The pottery lacks both cord ornament and pit-comb decoration and therefore seems not to be affiliated with Peterborough. Implement types associate Rinyo-Clacton with both the Secondary Neolithic and, in the north, the Circumpolar Stone Age. This phase of the Secondary Neolithic includes the remarkable settlement of Skara Brae in Orkney. At Skara Brae the lack of forestation produced some distinctive traits, not the least of which was the predominance of sheep over swine. This site also provides valuable information on housing, for the lack of lumber necessitated stone construction, even for interior furnishings. Fishing and hunting are reflected in the presence of fish, sea-birds, shellfish, crabs, deer, and whales. It is not certain that whales actually were pursued at sea, but the use of whalebone for implements and even roof supports suggests they may have been hunted. The absence of seal, however, bears the implication that sea-mammal hunting was by no means a major industry. Walrus tusk has been recovered but only in small amounts. There are no traces of cereal production.

Large stone bowls appeared at Skara Brae, as well as small stone cups which may be imitations of whalebone cups, for both

large and small vessels were made of whale vertebrae. One polished flint axe from Skara Brae is similar to Danish thin-butted axes. Polished-edge knives, small scrapers, and part of a triangular arrowhead were also present. From Skara Brae came fourteen stone axe or adze blades, and four are known from Rinyo; most are small and sub-triangular. A flagstone "hatchet" from Skara Brae resembles Gjessing's "boot-shaped" tools of Circumpolar distribution. A variety of spiked or knobbed objects of stone are characteristic of both Skara Brae and Rinyo.

Bone and stone tools from Skara Brae include ox-metapodial adzes related to Maglemose and Star Carr tools, various chisel-ended bone tools (Fig. 18: e), a perforated macehead (or axe sleeve), points and awls, polished blades (related to polished-edge knives?), scapula shovels, and bone and antler pins.

Beads of stone, bone, teeth, or ivory were found at Skara Brae. Pendants were made of teeth, or ivory carved to resemble teeth, but boar's tusk pendants were rare. Art was confined largely to pecking and incising zigzags, triangles, chevrons, and lozenges, with occasional cross-hatchings.

In the south there are no well documented Rinyo-Clacton settlements, but the first Rinyo-Clacton ware was distinguished at the site of Woodhenge. Southern Rinyo-Clacton ware is characterized by more complicated ornamentation. Tools include leaf-shaped arrowheads, petit tranchet derivatives (typical of Rinyo-Clacton), serrated flakes, scrapers, fabricators, single-piece

sickles, and possibly flint and greenstone axes. Stone balls and chalk phalli are known. Little is known of bone and antler types, apart from antler picks, scapula shovels, and bone points. Cattle in this area are like those of Windmill Hill; swine were abundant and sheep were not.

Rinyo-Clacton illustrates west French or Iberian influences (pottery and bone pins) impinging upon a Secondary Neolithic culture in the south, while in the north the same Secondary Neolithic elements are associated with traditions belonging to the Scandinavian Mesolithic and Circumpolar Stone Age.

Ronaldsway

The Ronaldsway complex on the Isle of Man is known from both settlements and cemeteries. The pottery is commonly in the form of large, round-based jars with rims which are often bevelled or small, flat-bottomed pots. Usually incised or punctate decoration is found on the rim of the first type, but the rest of the pot is plain. Axes characteristically have a thick oval cross-section, a truncated butt, and are deliberately roughened for about half their length from the butt, the remainder being polished. Flint axes and adzes two or three inches in length are found frequently in the Ronaldsway culture. A stone gouge (Fig. 18: i) of Circumpolar type and a perforated macehead turned up on one site. Lozenge-shaped arrowheads are typical, but one transverse point is a probable product of this culture. Polished flint knives form a link with other Secondary Neolithic groups. Serrated flakes

and concave saws of the "hollow-scraper" type show a gloss produced by grain-cutting. Stone balls occur here again. One bone pin with a mushroom head is known. Five small schist plaques appeared, one of which was an axe amulet. Ox, sheep, and pig are represented among the faunal remains.

Dorchester

The Dorchester "culture" is rather poorly defined. There is no consistent ceramic style on its sites, but it is distinguished by certain ritual monuments (some of which are within the Henge group), cremation cemeteries (as in Ronaldsway), and burial under round cairns. Stone types are shared with Secondary Neolithic cultures as a whole.

Dorchester sites are concentrated near Dorchester-on-Thames, but the first phase at Stonehenge belongs to this group, as do burials in Wiltshire, Oxfordshire, and Bedfordshire. Other burials and scattered finds indicate an extension as far as northeast Scotland.

Dorchester material equipment includes perforated stone maceheads,[1] partially polished flint axes, leaf-shaped arrowheads, petit tranchet derivatives, flint knives polished on the edges or faces, and fabricators. Antler and bone types are bone pins, perforated antler maces (some facetted), boar's tusk blades, perforated bone points (garment fringes?), and unperforated bone points. In addition, there are chalk balls, a jet belt-slider, and pottery of Western Neolithic, Peterborough, and Rinyo-Clacton types.

1. Secondary Neolithic maceheads, because of their cylindrical perforations, probably were not derived from Mesolithic maceheads, which have hour-glass perforations.

No European parallels to the Henge monuments are known. Of two types of burial—inhumation under a round barrow and cremation cemeteries—the former recalls British Beaker and Food-Vessel tradition (appearing at the time of Single Grave and Boat-Axe cultures in Denmark and Sweden). The cremation practice is best paralleled in Ronaldsway or Boyne cultures. The boar's tusk blades are common in Northern Stone Age cultures, especially the pit-comb burials at Västerbjers and Visby in Gotland (of the Passage Grave period in Scandinavia). Stone and antler maceheads are related to Mesolithic examples and then in turn to those of the British Bronze Age.

With the possible exception of Rinyo and Skara Brae, no village settlements comparable to those of the Danubian are known in the British Neolithic. Apparently individual farmsteads were the rule.

Collective burial, either inhumation or cremation, is characteristic of almost all British Neolithic cultures. These burials may occur in either chambered or unchambered tombs, and in some Secondary Neolithic cultures collective burial takes the form of cremation cemeteries, e.g., in Ronaldsway and Dorchester. Single grave burials which are found may be a reflection of Early Bronze Age practices.

Michelsberg

Much remains to be learned about Michelsberg, which is often loosely assigned to the Western Neolithic complex. Best known in

southwest Germany, it extended to Belgium, Bohemia, Austria, and Switzerland. Settlements are predominantly hilltop forts, although moor villages and pile dwellings also yield Michelsberg remains. In some cases rectangular buildings are arranged along regular streets. Most of the fortified sites seem to have been actual settlements, although some closely resemble Windmill Hill causewayed camps which are believed to have been cattle kraals and were earlier (Piggott, 1954b, 29-31). One Michelsberg earthwork, Beusterburg, in lower Saxony (Tackenburg, 1951) could have been nothing else but an enclosure for animals, for numerous openings breached walls which were too low for defensive purposes, and there were no hut foundations. The Mayen and Urmitz sites on the Rhine are very similar, but Goldberg and Michelsberg in southern Germany are less closely related (Ibid., 28). Fortified, elevated settlements are paralleled in Eastern Danubian and Funnel Beaker groups, but there are no clear antecedents of the causewayed camps in either the Mesolithic or early Neolithic. The Michelsberg examples are too late to be ancestral to the British ones, and it is most unlikely that the Continental kraals were derived from those of the British Isles. They could, of course, have been independent developments.

The flint mines at Spiennes, Belgium, represent a specialized aspect of Michelsberg. Flint-mining was another early Neolithic trait in Britain, e.g., at Grimes Graves (Piggott, 1954b, 45). The recent appearance of a double-ditched enclosure associated with

the Spiennes mines (Scollar, 1955) supports the relationship of Michelsberg with Spiennes and produces a further parallel with the British early Neolithic.

Michelsberg flint-working included a blade industry, among which was a number of transverse arrowheads (Fig. 18: d). Leaf-shaped arrowheads were used particularly in Belgium. Small celts were hafted in antler sleeves (Fig. 18: im, m, o-q), and flint blades were placed in slotted wooden handles (Fig. 19: d). Characteristic polygonal battleaxes are attributed to Michelsberg by Vogt (1954, Fig. 3 - 5). These axes usually have flat top and bottom faces and arched sides. The butt is sharply cut off, and two incised lines often run down the top (and sometimes the bottom) face. Most, however, are stray finds. In addition to antler sleeves, antler picks or axes (Fig. 18: h, n, s) and bone harpoons were widely used, although the harpoons are more characteristic of Swiss sites. The harpoon in Figure 19: 5 is a plain bone point perforated for the attachment of a line. Among the implements of bone we find combs like the Windmill Hill type, awls, chisels, needles, fishhooks (Fig. 19: f, g), and double-pointed gorges. Metal tools and ornaments appear with some frequency, but there is no evidence that these are anything but imports.

Large numbers of bones belonging to wild fauna illustrate the importance of hunting in Michelsberg culture. Cattle, sheep, and swine were raised and grain cultivated. Perforated teeth were worn as ornaments (Fig. 19: k).

Michelsberg pottery is most distinctive. The vessels, which possibly had wooden prototypes (Buttler, 1938, 82), include various storage pots, bowls, handled cups and pitchers, flat "baking plates," and tulip beakers. Ornamentation when present is usually in the form of fingertip or fingernail impressions; hatching and pits were used to some extent. The storage vessels with rims bearing fingertip impressions that we have already met in Funnel Beaker and Eastern Danubian contexts were a widespread form of utility ware. The baking plates presumably functioned as cooking utensils. Tulip beakers are round-bottomed and resemble the bell of a trumpet in profile.

Little information is available on burial practices. A number of graves with contracted or extended inhumations have been found, some in the remains of houses. At Altenburg was a cemetery consisting of seven graves with only a few beads as grave goods and cremations occur in Belgium. In addition to burials in Belgian hut foundations, there have been found deposits of Michelsberg skulls in abandoned flint-workings at Spiennes, recalling the Ofnet skull deposits of Bavaria.

Fig. 19. Mesolithic implement types of the Secondary Neolithic: II

a, b. Horgen
c, h, j, l-r. Fort-Harrouard
d, f, g, k, s. Michelsberg
e, i. British Secondary Neolithic

(After Vouga, 1928; Philippe, 1936; Buttler, 1938; Piggott, 1954b.)

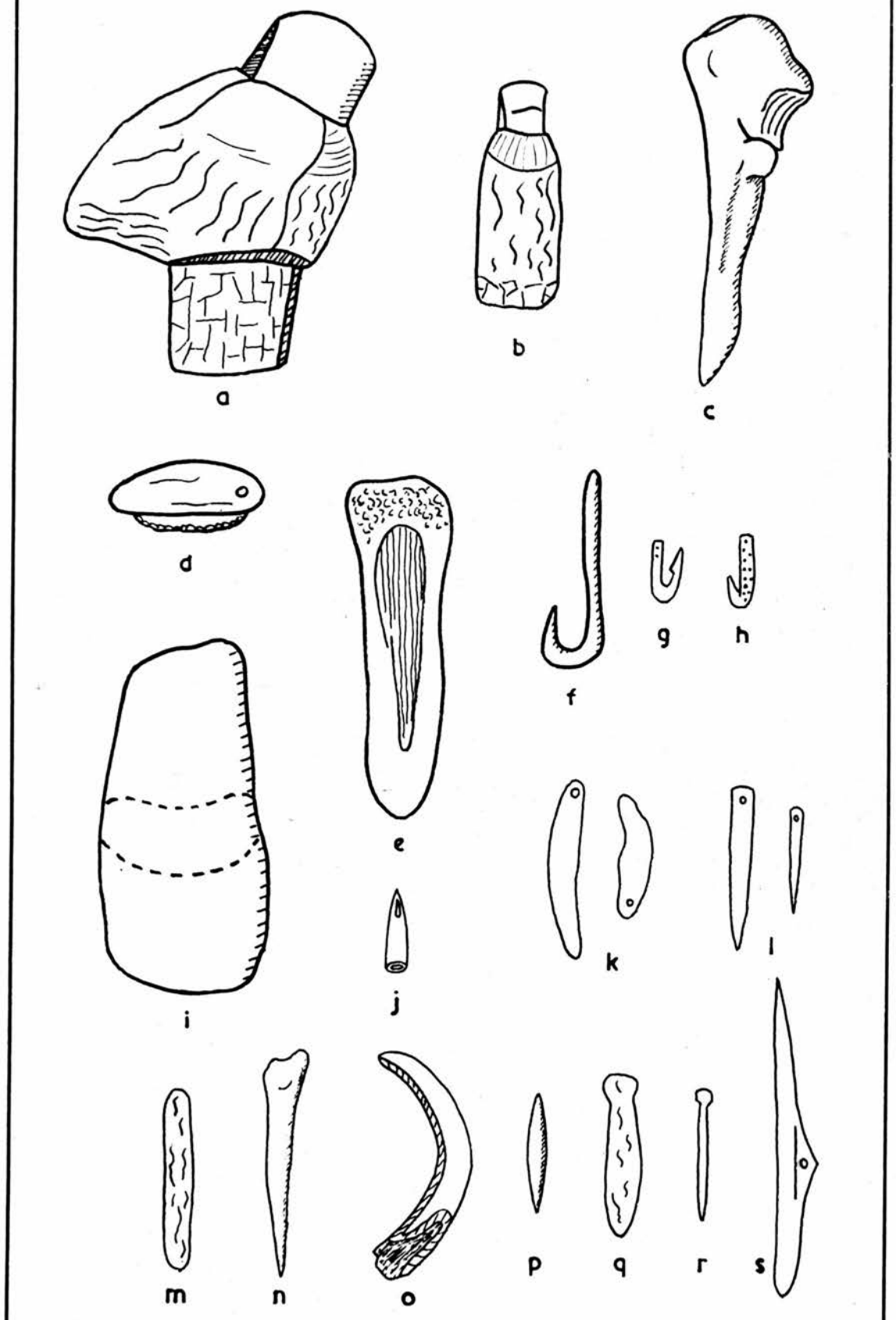

Fig. 19

On the basis of recent radiocarbon dates, Michelsberg appears to have been at least partially contemporary with Rössen. Over most of its distribution area Michelsberg was succeeded by Cord-Ware and also by Horgen in Switzerland and southernmost Germany.

The origin of Michelsberg presents the biggest problem, for it really fits in no group very well. Michelsberg does resemble some of the Western cultures to a certain extent, but the differences are becoming sharper and sharper (Vogt, 1954, 185). While rectangular houses, fortifications, handled pitchers, and perforated axes fit into the Danubian framework, the typical ceramics seem foreign to both Danubian and Western economies.

Reinecke (1908; 1942) has long called attention to the similarity between Michelsberg and Ertebølle round-bottomed pots and suggests a relationship between the two areas. Vogt (1954) has seen that if Funnel Beaker and Michelsberg distributions are plotted out the two are contiguous, and consequently believes Michelsberg is but a southern extension of the Funnel Beaker culture-area. There are many ceramic correspondences in the two cultures. Grimm (1937, 162) noted the similarity between certain Baalberg pots and Michelsberg tulip beakers. This, in turn, brings to mind the presence of large storage vessels and baking plates in the Early Neolithic A occupation at Store Valby, Zealand (Becker, 1955, 196). Storage pots even closer to the Michelsberg type are known in the Wiórek, or early, Eastern Funnel Beaker culture of Poland (Jazdzewski, 1936, Fig. 10). Chronologically, the early Funnel Beaker cultures are probably not

far out of line with Michelsberg, as radiocarbon dates seem to indicate (Troels-Smith, 1956). A mixed occupation at the Hutberg hill fort in Merseburg includes Michelsberg, Jordansmühl, Baalberg, and Salzmünde, and Benesch (1941) stresses the fact that all the leading types of Michelsberg either occur in or show relations with the Funnel Beaker cultures. Polygonal battleaxes strengthen such an assumption, although they have not been sufficiently well studied to provide proof for uniting Michelsberg and Funnel Beaker cultures. Most of these associations are admittedly typological and leave a great deal unexplained, but they seem to give some direction to years of theorizing about the place of Michelsberg in European prehistory.

One thing not subject to doubt is the Mesolithic strain permeating Michelsberg, as seen in the use of antler and bone implements such as axes, sleeves, combs, fishhooks, gorges, and harpoons, the emphasis upon hunting and fishing, skull deposits, and the occurrence of moor settlements. Because of its relatively late date, Michelsberg appears to be an acculturated Mesolithic group in which there is a distinct preservation or revival of Mesolithic traditions, i.e., a Secondary Neolithic culture. Spiennes is a part of the "Campignian" complex according to Nougier (1950, 331-2). Also, Michelsberg, with the other "lacustrian" Neolithic cultures is supposed to have come under Campignian influence (Ibid., 202 ff.), and a "Campignian" heavy flint industry is one characteristic of Secondary Neolithic cultures in Britain (Piggott, 1954b, 277).

Another characteristic is degeneration of ceramic technique. In this respect the coarse storage vessels and tulip beakers come to mind, for these are the most characteristic pot forms, although more finely-made handled vessels occur with them. The coarseness of Michelsberg tulip beakers has led to comparisons with Ertebølle beakers, as we have already seen. At least over much of their domain the Michelsberg people were semi-nomadic pastoralists and hunters, relying on game as well as on crops and herds.

It seems highly probable that further investigation will show Michelsberg was not one homogenous group, but that its economy varied according to local conditions. In the area of south Germany-Switzerland Michelsberg is hardly separable from Cortaillod, except by ceramic comparisons. In southwest and central Germany its use of fortifications as well as the appearance of the pottery allies it with late Danubian and early Funnel Beaker cultures. On the basis of present evidence it still seems impossible to conclusively assign Michelsberg to any particular groups, although the Funnel Beaker cultures present the closest affinities. Particularly if Ertebølle is not regarded as part of the earliest Funnel Beaker cultures in the North, Michelsberg embodies more Mesolithic traits. In any case, much in Michelsberg is clearly not of Funnel Beaker origin. It does not seem strange that a culture developing on the cultural crossroads of Neolithic Europe should absorb traits from local representatives of all three major Neolithic culture-areas while retaining certain Mesolithic traits. We seem to be dealing with a highly

adaptable society which took advantage of whatever its environment happened to offer.

The Schussenried culture is closely related to Michelsberg, if it is not a sub-group of the latter. It appears primarily in the regions of Federsee and Stuttgart, where the leading ceramic forms are pitchers with and without handles. There are also large Michelsberg storage vessels, clay ladles, amphorae related to Altheim forms, and handled cups. The small pots are decorated richly with incised hatching, chevrons, triangles, and zoned patterns. Vogt (1953, 35) describes Schussenried as a fusion of late Danubian and Michelsberg.

Fort-Harrouard

Northward diffusion of Chassey resulted in contact with Mesolithic inhabitants of northern France and subsequently the rise of two Secondary Neolithic cultures, Fort-Harrouard and Seine-Oise-Marne. The first of these is known primarily from a single settlement and the second only from graves.

Two Neolithic occupations have been recognized at Fort-Harrouard, a fortified spur in Eure-et-Loire (Philippe, 1936 and 1937), where late in the Neolithic period a group of cattle-herders settled. The ceramics are affiliated with those of Michelsberg and Chassey and found in association with tools of flint, stone, bone, and antler. The second Neolithic horizon has approximately the same tool types but more evolved pottery. Neither Fort-Harrouard I nor II contained any metal.

Both "pit-dwellings" and "granaries" were attributed to the Neolithic occupations. Burials on the site were extended in Mesolithic fashion; those in the older Neolithic level were ruined, but in the next stratum an infant was found buried in a grave with a couple of bone awls, an amber plaque, a sandstone polisher, a limestone plaque, a flint saw, part of a greenstone axe, and a small, two-handled pot. The whole affair was superimposed upon a litter of half-burnt bone, which suggests a tradition of ritual feasting or sacrifice (as at Téviec). Another skeleton, an adult, was accompanied by five crushed infants' skulls, burnt bone, Fort-Harrouard II sherds, a clay ball and block, a bone dagger, two fragments of deer antler, and part of a polished axe. The bone dagger is again reminiscent of Téviec, or at least the Mesolithic in general. Since the funeral practices remained the same--the corpse interred in his hut without fixed orientation accompanied by bones indicating a ritual feast or sacrifice--until the late Bronze Age and reappeared at least partially in La Tene III, Philippe (1936, 555) believes the same group occupied Fort-Harrouard throughout. A megalithic tomb sits about 250 meters south of the camp, but its affinities have not been established.

Most of the Neolithic tools were of local flint, which was made into scrapers, knives, saws, chisels, axes, picks, and arrowheads. Picks and tranchet axes (Fig. 18: e) of Campignian type were supplemented by a few polished axes with oval cross-section, although polished tools were notably rare. In the category of

weapons transverse arrowheads (Fig. 18: c) were predominant. At least by the time of Fort-Harrouard II Grand-Pressigny flint was being imported for the manufacture of daggers. From Fort-Harrouard I were some large hooked flint blades (Fig. 18: g), or bec de perroquet, which may have been single-piece sickles.

From antler were produced picks (Fig. 18: n, r), axes, notched pendants (Fig. 19: q), and flaking tools (Fig. 19: m). Bone was used for ulna daggers (Fig. 19: c), awls (Fig. 19: n), pins (Fig. 19: r), needles (Fig. 19: l), and occasional plain points (Fig. 19: j). Gorges (Fig. 19: p) and fishhooks indicate line-fishing. One of the bone fishhook shanks was decorated with pit-ornament (Fig. 19: h). Boar's tusk laminae (Fig. 19: o) probably were used for tools and ornaments.

The Neolithic ceramics at Fort-Harrouard included undecorated vessels as well as pottery decorated in relief or with incisions, associated with Michelsberg baking plates, spinning whorls, spoons, and crude figurines. The undecorated sherds belonged mostly to smooth-surfaced pots with round bases. Handles, properly speaking, were absent, but some of the vessels had perforated or unperforated lugs. Those pots decorated in relief were least important. Lugs or warts were no longer used as handles but just as ornamentation. Fingernail and fingertip impressions were commonly used for decoration in Fort-Harrouard II. The Chassey ware at Fort-Harrouard often had incisions filled with white paste. Vase supports were much in evidence.

Cattle provided the economic basis at Fort-Harrouard, although there is some evidence of cereal production and hunting and fishing.

Fort-Harrouard is one of the few French sites providing sufficient amounts of bone for faunal analysis. Cooking refuse was composed primarily of domestic animals, with cattle representing 67% of the total. Pig (18.5%), sheep and goat (10%), roe-deer (1.7%), and dog (0.5%) accounted for most of the remainder. Of 169 bone fragments in the Neolithic II ossuary, 138 or 81.6% belonged to cattle, while swine made up 6%, sheep and goat 4.7%, dog 1.7%, fox 4.7%, and deer 1.2%. The teeth of bear and wolf were kept as hunting trophies or amulets.

Mandibles and vertebrae of pike and other large fish as well as small middens of shellfish indicate exploitation of the natural resources of the rivers.

The flint industry of heavy "Campignian" tools and transverse arrowheads, the inventory of bone and antler tools, the affinities with Michelsberg, and the burial practices--all in association with Western Neolithic (Chassey) elements--mark Fort-Harrouard I - II as a Secondary Neolithic complex which developed as a compromise between Mesolithic and Neolithic traditions after the first colonization by agriculturalists from southern France.

An even clearer example of the result of this acculturation process in France is exhibited on the island of Er Yoh off the Morbihan coast (Péquart, 1926). In the center of the island was a raised terrace containing bone and cultural debris. The stone

industry ranged from crude quartzite pebble tools for dislodging shellfish to polished axes and barbed arrowheads. Antler was limited to a few worked fragments, but bone was used for points, awls, daggers, chisels, and polishers. Hide-scrapers were made by jamming a gouge-shaped piece of bone into the spongy tissue on the end of a fractured long bone.

Animal bones were extremely well-preserved, and the domestic fauna have been tabulated by Reverdin (1931):

sheep	26
cattle	12
pigs	4

The predominance of sheep on this rocky isle reflects the lack of forestation as at Skara Brae in the Orkneys. Dog and goat were not identified among the remains.

Seal-hunting was attested by the abundance of seal bones, and fowling was indicated by the remains of auk, cormorant, and herring gull. Other wild fauna were not abundant but included deer, horse, hare, beaver, and feline.

The Er Yoh people had added only stock-raising and a few more sophisticated tool types to an economy already established in the Mesolithic by the Téviec and Hoëdic Tardenoisians on the same coast.

Seine-Oise-Marne

This population is known almost entirely from collective burials in caves, rock-cut tombs, or gallery graves. The gallery graves

are usually built in trenches dug into hill slopes, the entrance being at the shallow end of the trench. The passage itself is divided by a porthole slab or two notched slabs placed edge to edge. Stylized representations of the funereal deity ("Mother Goddess") in the form of breasts appear on the walls. None of these tombs is covered by a long barrow.

The grottos or rock-cut tombs are typical of the Marne region. The chamber is entered by a ramp recalling the dromos of a Mycenean tomb. The structure is separated within by a chalk partition resembling the porthole slab of a gallery grave. On the walls are carvings or drawings of the Mother Goddess (usually reduced to symbols such as a figure, breasts, a necklace, and an axe). All but the tombs of SOM appears to be of local origin or development, and the tombs are clearly of Mediterranean derivation.

Pottery is coarse and simple in design. Decoration consists mostly of single scratches, an applied cordon, or occasionally corrugations. The typical pot has an everted rim, a slightly bulging body, and a splayed base—very like Scandinavian Late Neolithic or Swiss Horgen ware.

Although our knowledge of the economy is limited by the lack of settlements, much of the SOM equipment has Mesolithic antecedents. Transverse arrowheads (Fig. 18: a) are much in evidence, and there is a "Campignian" industry of picks, tranchets, and chisels (Bailloud and Boofzheim, 1955). Among the SOM sites in Belgium is at least a suggestion of a SOM occupation at Spiennes (Mariën, 1952).

Axes were hafted in polished antler sleeves with rectangular shaftholes (Fig. 18: k), and antler axes with similar shaftholes (Fig. 18: j) are sometimes referred to as "hoes." Awls, spatulas, and other small tools were made of bone.

In addition to the Mesolithic elements, there are well made blades of Grand-Pressigny flint, axe amulets, a few leaf-shaped or barbed arrowheads, and polished axes, which with the trait of collective burial indicate an intrusive Neolithic tradition.

Trephined skulls from SOM tombs are common, and cranial amulets are often found among the grave goods. Such cranial discs have also been found at Port-Conthy, Switzerland (Childe, 1929, 170). The leading ornament is an arc pendant of stone. Pierced teeth also were used for personal adornment.

Copper trinkets and even a few bronze axes have been recovered, justifying a Chalcolithic date; otherwise the culture is purely Neolithic.

The SOM people raised crops, bred animals, and engaged in hunting and fishing pursuits, but the relative importance of each of these endeavors is hard to determine since there are no known SOM settlements and therefore few faunal remains. Warfare was certainly one of the major pastimes, as shown by the number of weapons and skeletons with wound-marks. The presence of copper and Grand-Pressigny flint indicates trading was of some significance.

Seine-Oise-Marne influences were felt in the Channel Islands, the Armorican peninsula, Brittany, Switzerland, Belgium, Westphalia,

Scandinavia, and even the Balearics according to Childe and Sanders (1950, 7 - 11), but this postulated distribution is probably exaggerated.[1] In Switzerland, Horgen is said to be the equivalent of French SOM (Vogt, 1938) although this is open to contradiction. The method by which SOM influences reached Scandinavia has not yet been explained, but the correspondences in pottery and porthole cists seem to indicate some sort of connection.

Seine-Oise-Marne appeared during the late phase of Chassey and was at least partially contemporary with Beaker culture. There is some evidence that SOM lasted well into the Bronze Age. Attention has been drawn to the resemblance between Champagnian pedestalled urns of La Tene I and splay-footed SOM pots (Childe and Sanders, 1950, 14). However, the exact terminus of SOM is far from well established.

The features of SOM--its mixture of Mesolithic and Neolithic elements and its degenerate pottery--in the light of the culture's late date show it belongs to the Secondary Neolithic group of European civilizations. As a point of interest, Piggott (1954a) warns us that the apparent ceramic correspondences between such cultures as SOM and Horgen, much less between these and the British Secondary Neolithic, are hardly enough to support direct relationships. Such groups merely "share the common tradition of equally miserable pottery."

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1. Personal communication with Professor Piggott.

Horgen

This Secondary Neolithic group succeeds Cortaillod and Michelsberg in Switzerland, where its purest occurrence is at the Sipplingen lake dwelling on L. Constance. Vogt (1938) aligns Horgen with SOM, but the relationship between the two is not at all certain. Several land stations are found at the southern extremity of the Black Forest, where it appears to be linked with Altheim (Kimmig, 1950, 151). Vogt (1934, 93) also noted the chronological and cultural similarities between Altheim and Horgen, which have already been discussed.

Horgen pottery consists mostly of vessels with flat bottoms and nearly vertical walls like SOM and Scandinavian Late Neolithic ceramics. It is characterized by an extraordinary lack of variety. Vogt points out the fact that if such pottery were found in a pile-dwelling belonging to another culture, it would be classified as coarse utility ware. The clay used was extremely poor and the resulting pottery very thick. Decoration on these vessels is sparse, and what there is consists primarily of lines drawn carelessly around the rim and sometimes one or two broad channels placed below the edge.

Perforated Horgen axes are triangular to rhomboid in form. Arroheads are either triangular or tanged. Leaf-shaped daggers were also made of flint. Metal was known but not widely used. Unperforated axes and adzes were hafted in antler sleeves, of which there are two types. The first is a cylindrical form (Fig. 19:

b), and the second has a spur notched out on the base to prevent slipping (Fig. 19: a). Picks and chisels were also made of antler, and needles, awls, polishers, and pins were fashioned out of bone, but harpoons apparently are lacking. Ornaments of any sort are rarely found in connection with Horgen, although they were common in the Early Neolithic.

In the Federsee moor area, the Dullenreid site is assigned to Horgen. The dwellings are small rectangular houses, in contrast to the long Cortaillod buildings. These are duplicated by Altheim dwellings at Goldberg, and both appear to represent an innovation in house construction.

Hunting increased at the expense of herding, as shown by the faunal remains. In some sites the number of wild fauna increases in proportion to that of domestic animals from Early Neolithic (Cortaillod) to Middle Neolithic (Horgen). The best example of this occurred at St-Aubin (Port-Conthy) on L. Neuchatel (Reverdin, 1929):

fauna	St-Aubin IV (Cortaillod)	St-Aubin III (Horgen)
cattle	14.4	18.5
swine	21.6	22.2
sheep/goat	20.2	11.2
dog	11.6	3.7
	67.8%	55.6%
deer	7.2	14.8
elk	1.5	3.7
roe-deer	1.5	0.0

fauna	St-Aubin IV (Cortaillod)	St-Aubin III (Horgen)
ox	0.0	3.7
pig	2.9	3.7
feline	1.5	0.0
fox	2.9	3.7
wolf	1.5	0.0
bear	1.5	3.7
hare	1.5	0.0
squirrel	1.5	0.0
beaver	5.8	7.4
hedgehog	2.9	0.0
	32.2%	44.4%

From this we see that the percentage of wild fauna increased from 32.2% to 44.4% in the transition from Early to Middle Neolithic. It is possible that this difference may prove to be unusually great, for late Cortaillod levels at Burgäschi Sud-ouest, Lobsigen, Auvernier, and Cortaillod also contained over 40% wild fauna (Josien, 1956). At Cortaillod, differences between early and later levels were slight (Reverdin, 1929):

	E. N.	M.N.
wild	43.2%	45.5%
domestic	56.8%	54.5%

The culture as a whole is usually described as regressive, but this is the appearance produced by any Secondary Neolithic group. Although Horgen pottery resembles that of SOM, there are few definite associations in other respects. A major difficulty

in assessing the relationships is that SOM material is virtually all from tombs, which in effect gives us a very one-sided picture. In contrast, all the Horgen material is from settlements and none from graves. Vogt (1938, 8) cites some graves--a stone cist near Basel with 30 to 40 skeletons, the megalithic grave of Neiderschwörstadt (Baden), the porthole tomb of Courgenay (Berner Jura)--which might be attributed to SOM or Horgen, but the evidence for this is inconclusive. Horgen material was found near the Basel cist. Vogt also draws parallels between long antler sleeves of SOM and some similar sleeves in Switzerland. A semi-circular pendant, related to SOM arc pendants, was recovered near Saint-Blaise on L. Neuchâtel. Most of his examples are anything but convincing. If Horgen was derived from SOM, we shall need more proof than we have at present.

CHAPTER X

SUB-NEOLITHIC

Circumpolar Stone Age

The Circumpolar Stone Age (Gjessing, 1944), as the name suggests, is a generalized culture-area almost entirely encircling the globe in the polar and Northern forest regions. Strangely enough, some of the strongest resemblances in the whole area are to be found in northern Norway and eastern North America. The Secondary Neolithic cultures of Europe are affiliated with the Circumpolar Stone Age by virtue of the Mesolithic basis underlying each.

It is clear that there are two ecological zones to be considered, one of which is the tundra zone and the other the forest zone (Gjessing, 1953, 133). With the tundra are associated whaling, sealing, fishing, reindeer-hunting, the use of slate, and skin boats. To the forest belong inland hunting and fishing, ceramics, gouges, and so forth. These two were not, of course, entirely independent of one another. Skin boats and slate tools are found far from the tundra, in areas such as the British Isles. Among the inland elements in the maritime province are curved-back gouges, rectangular adzes, pebble hammers with handle grooves, single-piece flint sickles, serrated arrowheads, various types of harpoons, and bone points with inserted flint edges ("bird darts").

In the eastern United States are found both comb-ware and check-stamped ware (related to textile ceramics) which are virtually identical with ceramics of north Norway in particular. In the Eastern Woodlands, there are other reminders of its relationship with the Circumpolar region, e.g., crescent-shaped knives, slate implements, adzes, gouges, and similar bone and antler forms (Chapter XVII).

Among Circumpolar traits with Eurasiatic-American distribution are:

compound bows
bone hunting implements, e.g, barbed and plain points
detachable harpoon heads
serrated arrowheads with concave bases
"bird darts"
slate tools, e.g., rhombic cross-sectioned points, crescentic knives
curved-back gouges (hollow-edged chisels)
rectangular adzes
round pebble-hammers with handle grooves and simple grooved axes
crescentic flint or slate implements
skin boats (umiak)
semi-subterranean houses
comb-ware and textile-ware (the latter usually is found further north in both hemispheres)

boring of holes to mend vessels

rock carving and rock painting

simple geometric ornamentation

animal sculpture, especially animal-headed handles

"mouth-to-heart line" motif in art

Most of these traits appear in the Northern Mesolithic (especially the eastern Baltic), where they had their roots. The use of these Old Stone Age elements up to the present among the Eskimos serves to emphasize the excellent adaptation of Mesolithic hunters to an exacting environment.

Gjessing states correctly that in this area archaeology can not be divorced from ethnology and vice-versa. While chronology is almost lacking in the Circumpolar zone, the importance of the area archaeologically scarcely can be ignored when considering the Stone Age cultures of Northern Europe or North America.

A brief description (Tolstov, 1946; also Hančar, 1951, 57-8) of the Kel'teminar culture on the Oxus delta (Aral Sea) illustrates what appears to be an outlier of Circumpolar Culture. The site was inhabited by a sedentary hunting-fishing group. Houses built on the sand dunes were indicated by posts in three concentric circles, which probably supported roughly oval, wooden structures. In the center was a hearth, apparently for ritual use. Cooking hearths were around the perimeter.

The whole site was covered with bones, chiefly those of fish, wild pig, and red deer. Implements are of flint and a jaspar-like

substance and include microlithic blades, scrapers, chisels, awls, and flake arrowheads worked on one side only. There are also larger blades trimmed to a knife shape and some flat, polished slate knives with a curved edge. Other implements are unperforated greenstone axes of undetermined shape, bone points with long cylindro-conical shape, two bone hafts for harpoons (?), and smoothed sandstone slabs. As ornaments there are beads and pendants of marine shell, colored stones, bird pendants, and flat, chipped shell plaques perforated at the edge.

Pottery (sometimes painted) is composed of round-bottomed vessels of several types ornamented with stamped and scratched patterns arranged in narrow bands (especially on the upper parts). Typical ornament consists of trapezoids and rectangles filled with vertical impressions made with an oval stamp. Zigzag herring-bone patterns are common. In Anau II are sherds of Kel'teminar type.

Tolstov describes it as a "late Neolithic" culture with Mesolithic traditions and draws parallels with various Asiatic areas (but not with any region west of Russia). The culture is assigned to the fourth or early third millenium B. C.

The Kel'teminar culture has been placed in its broader setting by Jettmar (1954, 767), who describes it as a late Neolithic, pre-pastoral civilization of the Kazakhstan culture-area in the northwest steppes. Cross-dating supports the 4th or early 3rd millenium date. Kel'teminar II (Aeneolithic) of the 2nd millenium

represents the first pastoral nomad group of the area (Ibid., 768).

At Jarlshof in the Shetlands is a series of occupations which, although presumably dating well into the first millenium B. C., contains material related to both the Secondary Neolithic and the Circumpolar Stone Age (Piggott, 1954b). Stone types were mostly of slate in the form of rough axes or clubs, large hatchets, handled knives, rough saws, sickles, curved blades, and perforated heart-shaped objects (perhaps used as blubber-mattocks). There were also perforated bone adzes, bone chisels with or without sockets, scapula shovels, a perforated whalebone macehead, polished bone blades, points, and perforated phalanges. Most interesting was a subtriangular bone girdle-plate perforated at each corner, similar to those from VÄsterbjers and Danish passage graves. However, its incised decoration affiliates it with Iberian schist plaques, illustrating clearly the mixture of cultures in Britain.

Pit-Ware

In Scandinavia, the most significant Circumpolar Stone Age affiliate was the Pit-Ware, or Pit-Comb, culture, which entered the archaeological record during the Middle Neolithic. Numerous "dwelling-places" in Norway, Sweden, Finland, Estonia, and Russia were occupied by these people, and their influence was felt as far west as Denmark (Becker, 1950) and Britain (Piggott, 1954b, 312). Although producing pottery and raising a few animals,

Pit-Ware inhabitants were primarily semi-sedentary hunters and gatherers with a material culture based upon Mesolithic equipment. Their tool inventory (Äilio, 1909; Куркиё, 1950) of unperforated axes, stone gouges, many-shaped maceheads, antler axes and chisels, barbed and conical bone points, fishhooks of bone and stone, slate knives and points, slotted bone points, and nets has already been discussed in some detail in our consideration of the Baltic Mesolithic. Pottery is composed of coarse, predominantly ovoid vessels with cord, comb, or pit decoration. We have in this semi- or sub-Neolithic Forest Culture many elements belonging to Gjessing's (1944; 1953) Circumpolar Stone Age, including the pit-comb pottery itself.

The economic self-sufficiency of these groups did not prevent exchange of goods. Russian and Scandinavian flint were imported into Finland (Куркиё, 1930), East Prussian amber appeared from Norway to Russia, and Finno-Russian transverse and hollow-edged chisels entered Sweden. By just such means the characteristic tool types and pottery of the Circumpolar Stone Age must have been distributed from Britain to the Eastern Woodlands of North America.

Becker (1952b) believes the Pit-Ware people carried on most of the trade in flint with northern Sweden usually credited to Boat-Axe traders, since a detailed analysis of the flint hoards found in Norrland reveals closer affinities with Pit-Ware than Boat-Axe forms.

Куркиё (1930) set up a relative chronology for Finnish ceramics based upon Litorina strand-lines which has been found generally

acceptable. Close on the heels of Suomusjärvi culture came Pit-Ware, which falls into three main groups: Early (I), Typical (II), and Degenerate (III). During the first period cord impressions were present in addition to pits, furrows, incisions, and the dominant comb-stamps. Typical pit-comb pottery had long and shallow comb-marks, some of which were geometrical, often alternating with rows of pits. During the final part of this period comb-stamping began to fall off, until in the Degenerate style pits were predominant. This was followed by Boat-Axe cord-ware, representing intrusive agriculturalists and herders. Asbestos and textile ceramics have also been found in Finland.

During the entire Pit-Ware period, transverse axes and transverse or hollow chisels were the leading types, succeeded by axes with elliptical or rectangular cross-section. Small slate implements like fishhook shanks and sinkers first appeared with Typical Pit-Comb Ware. The same is true of amber, which was soon imitated in slate (rings and amulets). Russian flint was imported at this point only and is represented by pointed-oval or rhomboid points, small scrapers, and saws. When this material ceased to be imported, arrowheads of slate began to appear. During the Degenerate Period, relatively short and wide slate points were typical. The chisels appeared with the first Typical Pit-Comb pottery and remained in use until the end of the Stone Age. The old Pit-Ware transverse axes and chisels and small slate implements lasted all the way through also.

Simple shafthole axes and Scandinavian flint-work of the Late Neolithic appeared in the eastern Baltic during the later Stone Age in small numbers, and Boat-Axe elements are represented by rectangular axes and boat-axes.

Жуковская (Ibid., 212) looks to Central Russian pit-ware for the origins of Finnish pit-comb ceramics. In spite of the fact that pits dominate the Russian ware, he feels there are enough parallels to justify a connection. Although central Russia is generally accepted as the place of origin of pit-ware, there is little agreement regarding the source of comb-decorated ceramics. The early pit-comb ceramics are dated as early Passage Grave (early Middle Neolithic), and the complex as a whole lasted into the Bronze and Iron Ages of Central Europe.

Taking into account Жуковская's classification (and those of Foss and Gurina for Russia), Gimbutas (1953) has re-summarized the succession of ceramic styles in north Russia and the north-eastern Baltic. Her sequence begins with indigenous pit-comb pottery, followed by pit-ware of Central Russian origin and "classical pit-comb pottery" (Жуковская's Typical Pit-Comb Ware). After this appeared pottery decorated with impressed geometrical motifs, textile and asbestos ware, and finally flat-based, thin-walled pottery with cord and pit impressions. Gimbutas emphasizes the point that although there are broad cultural relationships over the whole Northern Forest Zone, we must recognize a number of ceramic styles, which may have been characteristic of different

ethnic groups. Thus, it is dangerous to use the term "Pit-Comb Culture" in too narrow a sense.

Belonging to the Pit-Ware realm were a number of Baltic "dwelling places" upon which lived sedentary hunters and gatherers who probably raised domestic animals, especially swine, as a supplement to their economy. The prolific occurrence of harpoons and seal bones indicates the importance of seal-hunting among the Pit-Ware people. One of the most interesting dwelling-places is the settlement-cemetery of VÄsterbjers in east Gotland (Stenberger, 1939 and 1943), which is assigned to the latter part of the Passage Grave period.

In the cemetery the graves were mostly oriented north to south and the bodies extended in Mesolithic fashion. The graves were in no way marked by stone construction. The dead typically wore wide bands of perforated teeth, which perhaps had been attached to shirts of some sort, and boar's tusk pendants were worn as ornaments. There was no discernible difference between male and female burials, except that harpoons were found with male interments.

A number of hearths with burnt bone and sherds were probably at one time in or beside huts (Stenberger, 1939, 69).

Grave vessels at VÄsterbjers were mostly pointed-based pots with rows of comb-stamps in stroke or punctate design. One sherd had two rows of pits, but cord-ornament, common in the dwelling-place strata, was totally absent.

On the settlement itself most pots—like those on other east Swedish dwelling-places—had a pointed base and a wide mouth with a groove just below it. Over four-fifths of the sherds were undecorated, and more than a third of the the remainder were pit-decorated only. The rest had comb- or cord-marked ornament or incising, often in combination with pits.

Axes of flint and stone were predominantly thick-butted, and of the axes, 32 were stone and 27 flint. Seventeen of the former belonged to the dwelling-place and the rest to the cemetery. Of the flint axes, all but four were from graves.

Among the stone axes were fragments of Walzenbeile and "Hamra" axes (resembling Limhamn axes but better in form and craftsmanship), but thick-butted axes with rectangular cross-section dominated. There were also three specimens of shafthole axes, one a Swedish or Finnish Boat-Axe type, one belonging to Late Neolithic, and one representing the first Danish battleaxe from the area. The stone axe series was rounded out by three miniature polished chisels or axes with oval cross-section.

There were three groups of flint axes, the chief one of which was thick-butted and usually completely, if crudely, polished. The other two types were quite similar and also polished. Again there were indications of contact with Boat-Axe Culture.

Arrowheads were of flint, slate, or bone. Tanged flake points ordinarily had a flat underside, giving them a trapezoidal or triangular cross-section. Only two transverse arrowheads appeared.

The slate points had short tangs, and all were of about the same form--narrow and parallel-sided with rhombic cross-section. The bone points were almost identical with those of slate, except that two had incised designs on the blades.

Flint seems to have been used rather sparingly at Västerbjers, for there were few small flint implements like scrapers and awls. This is apparently true of all Gotland dwelling-places and helps account for the many tools of slate and bone.

There were two types of barbed bone points, one quite large and heavy with stout barbs and the other smaller with more and finer barbs. The first type included fifteen made of pig tibia, with two large barbs on one side and a perforated base.

Boar's tusk "knives" were more likely to have been used as implements for scraping and skinning. They occur elsewhere in Gotland and occasionally in Norway and the rest of Sweden. In the North these were imitated in slate, producing the familiar crescentic knives (Childe, 1951, 200).

Awls, ordinarily of pig bone, were sometimes made of seal or dog bone and on one occasion of elk antler. Two long bone points were found which have grooves at the base--like the only two barbed fishhooks (boar's tusk and bone) from the site. There is one piece of a bone "chisel," which looks more like a scraper.

Some antler prongs, perforated at the base, seem to have been used as daggers or picks, for they apparently had been set in wooden handles.

Among ornamental objects, boars' tusk were very common. In some cases, they were clearly worn as necklaces, usually two teeth per person. These teeth were worked on the inside only. Typically, there were two perforations at the butt and one at the point. About 50 (32 bored) are known from the cemetery and about 21 (10 bored) from the dwelling-place. These appear in the Swedish Boat-Axe, Beaker, and Globular Amphorae cultures, and are especially important in Saxo-Thuringian (Central German Cord-Ware) culture (Stenberger, 1943, 91). In only three graves were there amber beads, but animal-teeth beads appeared in large numbers. Most were seal, pig, or dog teeth; in contrast to the Continent, deer teeth were not used. There were also tubular beads of bird bone, one dentalium bead, and six bone rings.

From Västerbjers came two decorated bone "girdle plates" of trapezoidal form with two oval-shaped perforations at the wide end and one perforation at the narrow end. Both were on a woman's body. The decoration resembled that on triangular bone plates from Danish passage graves. In East Prussia, two bone girdle plates were found with a battleaxe, and similar forms occur in Central and Eastern Europe. Most of these are trapezoidal or hemispherical. Boar's tusk blades and perforated bone pendants (similar to the perforated teeth of Västerbjers) are known in Britain from the Dorchester Culture, and a subtriangular bone girdle plate with a perforation at each angle is known from Shetland (Piggott, 1954b, 360-1, 364).

At VÄsterbjers, as in other coastal dwelling-places, swine outnumbered both cattle and sheep, and seals were well represented:

swine	72.6%	seal	10.9%
sheep	3.3%	bird	1.2%
cattle	3.1%	horse	0.7%
dog	6.7%	fox	0.7%
		fish	0.6%
		hare	0.2%

The high proportion of pigs suggests they were best adapted to a pastoral economy and required less care. At the Visby site in Gotland, swine accounted for 87.3%, sheep or goat for 1.8%, and cattle for 10.9%.

On the Finnish dwelling-places more wild animals appear, and swine are not even listed by Ailio (1909). However, seal remains are very numerous, and with fish, beaver, and elk make up the majority of the fauna. The remainder is provided by cattle or aurochs, dog, duck, grebe, and swan. Perch and pike account for most of the fish bones.

No grain impressions were found on the ceramic material at VÄsterbjers, and there were no millstones.

While older Gotland dwelling-places had a strictly hunting economy, VÄsterbjers and the analogous Gotland site of Visby had a semi-Neolithic economy, influenced by "Megalithic" culture, Neolithic cultures to the south, and, above all, Swedish Boat-Axe culture to the west. However, the lack of Boat-Axe ceramics

and graves must be noted, indicating that there probably never was an actual migration. Gotland's isolation, lasting throughout the Early Neolithic, had been broken down by the middle of the Passage Grave period. Stenberger (1943, 114) feels that Västerbjers represents a transition from a hunting and gathering economy to a Neolithic economy, but this is not exactly the case. Västerbjers and its sister dwelling-places were occupied by Sub-Neolithic groups of the Middle Neolithic who were taking advantage of natural potentialities in their environment, not continuing in a Mesolithic pattern of life wholly through ignorance of agricultural techniques.

One of the most informative Pit-Ware dwelling-places in Scandinavia is Fagervik in Kap. Krokek, Sweden. Bagge (1951) has described Fagervik as having the best and most complete stratigraphy of any east Swedish dwelling-place site so far discovered. Fagervik had five horizons (the last of which represented the late Boat-Axe culture) based upon beach levels and ceramic typology. Almost all the material consisted of potsherds. Of 170,000 sherds, approximately 26 per cent were decorated. The ceramics had numerous types of ornamentation, four or five kinds of construction material, and at least three different types of profile. Some plain, round-bottomed pots were found but are not as yet conclusively established, so they are not considered in Bagge's summary.

The ceramics have been divided into cord-ware, compact pit-ware, and porous pit-ware. The latter's porosity seems to be due to the fact that the tempering material consisted of organic or unstable inorganic substances which have long since disintegrated.

The first profile type (A) has a marked transition between neck and body, as on a funnel beaker. The second (B) is a bell-shaped (S-profile) degeneration of the first type. The third (C) is like (A) but with a sharp angle below the neck.

Fagervik I sherds were decorated by cord impressions, twisted cord, diagonally punctured pits, and stamped impressions. Occasional cross-hatching was noted. Profile A was dominant at this level. Although Early Neolithic influences were present, Bagge (1951, 94-5) feels that Fagervik I can be dated no further back than early Middle Neolithic (Troldebjerg).

Fagervik II pots typically had profiles of type B. Instead of cord-ware, compact pit-ware was the rule. In decoration the ceramics were rather heterogeneous. Some cord decoration and twisted cord decoration was carried over from Fagervik I. Vessels with cross-hatched designs on rim and belly were more common and sherds with only round pits were still present. "Megalithic elements" were coming in--single or double horizontal lines of chevrons, complicated vertical patterns, comb patterns, etc. This phase was contemporary with the early Passage Grave Period (Blandebjerg).

Fagervik III clearly represents an intensive occupation, probably due to a greater population and/or a longer occupation.

Almost all the pottery was porous pit-ware; only an insignificant amount of the compact ware was found. Profile B was dominated by C. The latter's sharp profile was characteristic of both III and IV. Pot bases were more or less pointed (flat bases were not uncommon in Fagervik II). Some of the ornamental motifs from Fagervik II continued, but dominant were horizontal rows of short strokes, some made by the comb technique. These were often combined with pits. Bagge feels this sort of ornamentation originated neither in the Scandinavian Megalithic nor in Baltic Pit-Comb dwelling-places. He notes that the pattern occurs as far south as Africa (Müller, 1923) on Nubian pots at the beginning of the third millenium, early enough to have spread from there all over Europe. However, it seems unnecessary to invoke such far-flung diffusion to account for this style.

Fagervik IV had a homogenous ceramic style: porous pottery with C profile. Vessels were covered all over with either regular comb-impressions or the "wolf-tooth" pattern. Round pits had disappeared, so we really can no longer speak of "pit-ware." The impressions were arranged vertically or horizontally in about the same ratio, diagonal patterns being somewhat less frequent. Both the regular comb-impressions and the "wolf-tooth" patterns are typical of a number of east Swedish and Gotland dwelling-places, although in Gotland, they were combined with pits. With Fagervik IV we near the end of the Middle Neolithic. Other similar sites (Torslunda II in Sweden, Jettböle II in Finland) may have continued

into the Late Neolithic, but probably by the end of Middle Neolithic many of the strand-loopers had switched to farming.

Fagervik V contained Boat-Axe ceramics of Forssander's types II - III, but no boat-axes are known from the site. Fagervik shows that ceramic styles II - III can be placed at the very end of the Middle Neolithic (Bagge, 1951, 105). Earlier writers have felt that Style I should be placed contemporary with Fagervik III, but Bagge feels the first part of Fagervik IV is just as likely, i.e., parallel with Ground Grave. If the four-part division of the Middle Neolithic (Bagge and Kaelas, 1950) is accepted, Style I would belong at the beginning of Middle Neolithic d.

One of the most remarkable Pit-Ware sites in the northern U.S.S.R. is the cemetery at Olenii Ostrov on Lake Onega. Here were found over 150 extended, ochre-sprinkled burials with associated grave goods (Raudonikas, 1940). Pieces of finely retouched flint for insertion in composite implements were numerous. Other small flint implements included awls and scrapers, rectangular blades, and long pointed blades (some tanged). Schist, bone, and antler tools were especially characteristic, and not least important were a variety of unilaterally barbed harpoons. Of decorative and/or supernatural significance were pendants of wild animal canines and incisors, sculptured figurines in bone and antler (elk heads, winding snakes, humans), and animal-headed knives. Ceramic ornamentation was effected by the use of a bone or antler punch, the impressions being arranged in zigzag lines.

There was no evidence of any agricultural pursuits, so the group represented must have been sedentary hunters and fishermen, unless the cemetery functioned as some sort of tribal "burial ground."

A somewhat analogous cemetery in the U.S.S.R. is on the Sea of Azov near the town of Mariupol (Makarenko, 1934). Artifacts included animal-teeth necklaces, awls and tubes of bone, round beads with side holes, stone pendants and maceheads, flint scrapers, knives, drills, and chisels. The maceheads were globes with four hemispherical projections. There was a great variety of ornamental objects, such as plaques, pendants, and beads made of bone, teeth, and shell (including mother-of-pearl). A number of things were manufactured of the outer laminae of boar canine. Only hunting was attested; there were no signs of pottery, domestic animals, or agriculture.

It has been shown that Pit-Ware culture is represented in Denmark (Becker, 1950), where all the settlements lie either close to or directly on the coast, and the finds are often mixed with Ertebølle material (this association is said to be accidental). Important Pit-Ware settlements occur on the island of Amager, in the upper level at Sølager, at Aagaard in east Jutland, and on the islands of Hesselø and Anholt in the Cattegat. Several are known on Bornholm, but culturally this island is associated with the adjacent Pit-Ware areas of Scania and Blekinge in any case.

Pottery is very similar to west Swedish material and distinct from Funnel Beaker or any other Danish ware, but little of it has been found. Better indicators are certain flint types, the most crucial of these being cylindrical cores producing long blades from which long, tanged points were made. Arrowheads of this type have been found on Pit-Ware sites and rarely elsewhere. Hardly anything is known of bone types; one harpoon and some barbed hooks may belong to the Pit-Ware culture. The bone ornaments so typical of Gotland are little known in Denmark, though a burial at Strø by in southeast Zealand contained amber and pig-teeth beads, as well as split and polished laminae of boar's tusk.

Becker regards Pit-Ware culture in Denmark as an independent culture of the Middle Neolithic, existing at the same time as Ertebølle, Funnel Beaker, and Single Grave cultures but culturally separate from them. Ertebølle probably disappeared when Pit-Ware was at its zenith, and though Ertebølle and Pit-Ware seem closely related there is little possibility of deriving one directly from the other (Ibid., 269).

There are few associations of Pit-Ware with either Jutland or East Danish Single Grave cultures, but Becker thinks the special tanged arrowheads of these cultures copy late Pit-Ware points. Flint axes and other Single Grave forms are known from Swedish and Norwegian Pit-Ware settlements.

The earliest phase of Pit-Ware culture is dated at Middle Neolithic b - c, a time which within the Funnel Beaker culture corresponds to the settlements at Blandebjerg, Trelleborg, and

Bundsø. Later Pit-Ware corresponds to Middle Neolithic c - d (Bundsø, Lindø). Apparently Danish Pit-Ware settlements were later in time than those in Sweden. It is probable that the Pit-Ware people were in Denmark to obtain flint, some of which was for trading purposes (Becker, 1952b).

Indications of Pit-Ware settlement also have been noted in Germany over the past twenty years or so. Most of the material comes from dune-land dwelling-places and is thus in the nature of surface finds. Also, unfortunately, the majority of finds are potsherds, so little is known of tool types. Pit-Ware settlement, if we are to judge by the number of finds, seems to have been heaviest in Silesia (von Richthofen, 1934 and Coblenz, 1951). Ornamentation consists of various linear patterns and pits. Especially characteristic are deep pits produced by pushing the punch almost completely through the wall of the vessel, leaving a series of bosses standing out on the inside surface. Linear furrows and comb stamps were used, and there are a few examples of whipped cord decoration (von Richthofen, 1934, 69). There is no clear chronological division of the Silesian material, but it appears to be more closely related to Polish and Russian Pit-Ware than to that of Finland.

Still further west, on the lower Rhine, similar pottery was found (Kersten, 1938). The Rhineland finds are also from dune areas. These sherds have incised, pit, twisted-cord, and fingernail-impression ornamentation. In Holland, there are comparable

vessels known as Glockenurenen. Kersten feels the Pit-Ware elements of western Germany and Holland provide the link between the northern Pit-Ware dwelling-places and British Peterborough.

CHAPTER XI

INTRUSIVE WARRIORS

Cord-Ware

The term "Cord-Ware" is applied to a series of cultures which, late in the Neolithic period, extended from the Caucasus to the Baltic and Atlantic provinces of Europe. These people were apparently pastoralists of a rather warlike nature who buried their dead singly in shaft-graves, most of which are surmounted by barrows. Frequently the burials are grouped in small cemeteries, suggesting a fairly sedentary life was led by some of the Cord-Ware folk. Like the Globular Amphorae people, they were prone to using megalithic tombs if these happened to be easily available. The inclusion of a stone battleaxe in many of the single graves has led to these cultures also being called the "Battleaxe" cultures.

Saxo-Thuringian

The "classical" Cord-Ware culture of Central Europe is Saxo-Thuringian, whose cemeteries of flat graves or barrows are concentrated in the Saale basin but extend to Bohemia, Switzerland, and the Rhineland. Swiss Cord-Ware belongs to the Neolithic-Bronze Age transition, succeeding Horgen.

Saxo-Thuringian beakers have flat bases, ovoid bodies, and high necks. Normally associated with them are amphorae. Both

incised and cord-marked ornament appear on the vessels. Two styles can be seen among the beakers: cylindrical-necked and funnel-necked, and Sangmeister (1951, 48) set up three hypothetical phases of Saxo-Thuringian development based on these differences. The first was a relatively short period during which cylindrical-necked beakers with furrowed-stroke decoration appeared within a limited area. The second phase began with the appearance of funnel-necked forms with cord decoration, marked at its peak by a mixture of ceramic types. The third phase is an even more hypothetical one in which Saxo-Thuringian Cord-Ware diffused and "colonial" forms developed. There is no stratigraphical evidence for such a division, and the funnel-necked group, by virtue of its distribution all over central Germany, seems to have been present at an early stage of Cord-Ware development (Mildenberger, 1953, 64). Šturms (1952, 19) believes the "older" and "younger" groups were in actuality two different but contemporaneous groups, one an intrusive Battleaxe culture and the other an indigenous one. The local farmers adopted cord ornamentation, while the Battleaxe people took over some of the local ceramic types.

The characteristic implement of Saxo-Thuringian is a facetted (polygonal) battleaxe of stone, but such axes are not normally found in graves in the west and are not found with the supposedly earliest pottery (Sangmeister, 1951, 50-1). Other artifacts which occasionally occur in conjunction with Saxo-Thuringian

material are antler axes, stone adzes, spherical maceheads, and a few copper and bronze ornaments. Mazalek (1954) credits Central European Cord-Ware cultures with a number of Tardenoisian-type blade and microlithic tools, including transverse arrowheads, tanged blade points, discoid scrapers, end-of-blade scrapers, truncated blades, microlithic triangles, and microburins. Daggers, awls, and chisels of bone sometimes appear in burials (Fischer, 1956, 232). Shell beads and perforated teeth were used quite commonly for personal adornment, and boar's tusk pendants are typical.

Saxo-Thuringian Cord-Ware was a late Neolithic culture which overlapped Globular Amphorae and Walternienburg-Bernburg on the one hand and the Bronze Age on the other. It must have been roughly contemporary with Single Grave culture in Denmark. Attempts have been made to derive Saxo-Thuringian from cultures in Denmark, Central Germany, and the Pontic Steppes. While none of these has been conclusive, an origin in the southeast seems most logical at this time. Perhaps all the Central European Cord-Ware cultures resulted from the contact of indigenous Mesolithic tribesmen with pastoral "warrior-nobles" from the Pontic Steppes.

Schonfeld is generally regarded as a special Central German Cord-Ware group. The oldest (Ammensleben) phase was derived from Saxo-Thuringian Cord-Ware according to Grimm (1940, 391).

Oder

The Oder Battleaxe Culture in Brandenburg is closely related to Saxo-Thuringian. Typical Saxo-Thuringian battle-axes and beakers were in use, but steep-walled flowerpot beakers replaced the amphorae. Funnel beakers, funnel bowls, "spigot" beakers, S-profiled beakers, four-handled beakers, cups, and two-handled jars are also credited to Oder Cord-Ware (Sprockhoff, 1926, 57). The flowerpot beakers occur in Northern Europe from Jutland to Poland, but the exact source of the Oder type is not certain.

Flint axes with pointed-oval cross-section and Danubian celts are found in addition to battleaxes. Triangular arrowheads, Scandinavian flint daggers and bronze ornaments are found in graves with occasional flint knives and scrapers (Schroeder, 1951, 63-6).

Burial is in flat graves (sometimes with barrows) and stone cists.

Marschwitz

This group in Silesia and Moravia is related to the Oder culture, but it is also closely associated with the Early Bronze Age (Childe, 1929, 223). The very distinctive battleaxes resemble the Fatyanovo type.

Zlota

The Zlota culture on the Polish loess around Kielce appears to be a late hybrid, containing elements from Saxo-Thuringian

and Oder Cord-Ware, Globular Amphorae, Funnel Beaker, and Baden (Childe, 1950, 142). Battleaxes do not often occur, but when they do they are similar to Marschwitz battleaxes. Contracted burials are found in cemeteries of flat graves or pit-caves. Ritual burials of cattle, swine, and horses recall Jordansmühl and Baden practices.

French Cord-Ware

With the appearance of Seine-Oise-Marne in France occurs cord-decorated pottery which is paralleled by late Neolithic Swiss cord-ware. In France, there are a number of beakers with cord-marked ornamentation, which are also found in Britain. Childe has shown that this type of beaker is distinct from that with zoned incisions and does not belong to the Western Beaker tradition but was derived from the Cord-Ware cultures of the North and East. The French cord-marked beakers, as well as the British beakers, must ultimately be traced back to the Rhineland (Piggott, 1954a, 6). From the same area Northern Battleaxe elements, e.g., stone battleaxes and individual burial under a barrow, pushed westward as far as the Pyrenees and Brittany, where they are found at the onset of the Breton Bronze Age.

Single Grave

Relatively early in the Middle Neolithic a Scandinavian Cord-Ware culture, the Single Grave group, appeared in west and central Jutland. At the same time another branch entered southern Sweden, forming the Swedish Boat-Axe culture. Later,

east Jutland and the islands were overrun, resulting in the formation of East Danish Single Grave culture. Through the medium of these intruders, Beaker influences came in from southwestern Europe (Glob, 1948, 89).

In the Single Grave culture, bowls and straight-walled beakers occur with S-profiled vessels. Since cord ornamentation was present in the pre-dolmen Early Neolithic B of Denmark and the Vråå culture of Sweden, the opinion has been expressed in the past, notably by Åberg, that Danish Single Grave evolved out of the local Funnel Beaker culture. Becker (1948) shows, however, that this Early Neolithic "cord-ware" is merely an element within certain non-megalithic groups and not true cord-ware. Scandinavian authorities now seem to agree that a Scandinavian origin must be rejected. For one thing, there is a time-gap between Early Neolithic "cord-ware" and Single Grave emergence. Certain structural features such as plank cists and encircling trenches are related to Battleaxe burial in south and central Russia, as well as in British round barrows (Childe, 1948b, 58). Glob (1945) has suggested that the homogenous appearance of the earliest pottery and battleaxes speaks for an immigration within a relatively short period. This sudden population movement may have been caused by a warmer and more arid climate on the steppes during the Sub-Boreal. Such a change, acting upon a well-populated grazing area, could result in large-scale emigration, but the exact point of departure remains a problem.

Particularly since Vrå polygonal battleaxes coincide fairly well in distribution with boat-axes (Childe, 1948b, 59), attempts have been made to derive Single Grave battleaxes from the Early Neolithic forms, but this has not yet been convincingly demonstrated.

Danish Single Grave culture is known primarily from graves, either single graves, stone cists, or secondary burials in passage graves. Only a very few settlements are known, and they have not been well investigated. The type implement is a perforated battleaxe, usually made of greenstone. There are also various types of "doughnut" maceheads, tongued wedges, single- or double-edged flint axes (perforated and unperforated), triangular cross-sectioned arrowheads with very long tangs, amber ornaments, chisels, and long bone needles. Only in the final phase of Single Grave development did it become common to give the dead a drinking cup (Glob, 1945, vi).

Attention has been drawn to the fact that Megalithic people occupied moraines covered by oak-mixed forest, while Battleaxe newcomers in Jutland and Schleswig-Holstein took over poor outwash sands with oak-birch vegetation easily reduced to heath by burning and grazing (Clark, 1945, 62). The latter would have been more suitable for sheep raised by the more pastoral Battleaxe people, the former for cattle and swine. Eventually, of course, the Battleaxe tribes displaced or absorbed all the Megalithic people.

On the basis of their position in relation to the ground surface the graves have been divided into three chronological groups: Bottom Graves, Ground Graves, and Upper Graves. The first type was placed in the subsoil, the second at the original earth surface, and the third in the mound fill itself. Battle-axes are the chief grave goods found in these tombs. Glob (1945) divides the battleaxes into a chronological series designated by the letters A - L, which in turn are subdivided into further variants. The basis for such a division rests upon discoveries containing more than one battleaxe, mounds with superimposed graves, and typological characteristics of the axes considered separately.

Pottery is found more rarely in single graves, but the ceramic development can be at least partially aligned with the battle-axe series. Both Megalithic and Beaker influences are discernible in the ceramics. Cord-marked beakers with an S-profile are typical of Bottom Graves. In the Ground Graves beakers often have incised herring-bone ornamentation. The pots in Upper Graves are more cylindrical and have zigzag comb-marked decorations and the appearance of flint daggers implies a date in the Late Neolithic (Childe, 1951, 164).

The treatment of flint supports an external origin of Single Grave culture, i.e., flint-work is not as fine as that of the Megalithic (Glob, 1945, viii). Arrowheads are relatively rare in Jutland single graves, though triple-faced points are commonly

found to the east. Polished transverse arrowheads were made throughout the area.

Amber ornaments were placed in graves of both men and women. Circular amber discs are found in male Bottom Graves. In women's graves are tubular amber beads, round beads, and oblong pieces perforated at the ends. These are found in all periods, but most are from Bottom Graves. The types found with female interments also occasionally occur with male burials.

The Single Grave mounds vary in size according to the number of graves and whether the mound was added to in later times. The mounds almost always occur in groups of ten to twenty near lakes and rivers, and most are on good soil rather than on the poorer gravels. Graves may or may not be outlined with stones. Earlier graves are oriented east and west; in the Upper Grave period they have a more northern orientation. In early single graves, the corpse was laid in a board coffin and the bottom of the grave paved with small stones. In the Upper Grave period, a holloved log was used as a coffin, a practice which was popular in the Bronze Age. Around the graves are often visible circular trenches up to one meter in depth.

Although the bodies are not ordinarily well enough preserved for comparison, it has been determined that in the Bottom and Ground Graves the deceased were laid on their right sides with the left arms flexed, right arms extended, and legs folded. At a later period, extended dorsal burial came into

use, presumably because of Megalithic influence. Occasionally, graves of a man and a woman were intentionally placed together in a mound, suggesting they had been man and wife.

Simple earth-graves also appear in the Single Grave region, and dolmens and passage graves were willingly used for sepulchres. Stone cists were already being built by Single Grave people, so the term "Stone Cist Period" is not strictly applicable to the Late Neolithic (Ibid., xi).

In Sweden, Boat-Axe people also introduced a new form of burial and new implement types. Single, flexed burials are typical, although the graves are not covered by barrows (Childe, 1951, 165). As is common in other Cord-Ware groups, the graves often form small cemeteries. Males are buried with a boat-axe of stone and sometimes with polished thick-butted axes, flint or greenstone gouges and chisels, clay eating utensils, or beakers. The thick-butted greenstone axe of the Boat-Axe Culture has a characteristic form and has been recognized on sites in Finland and Norway. Hollow-edged chisels or gouges typical of Baltic and Circumpolar cultures are very common. These are almost certainly woodworking tools and are well known in Mesolithic cultures (Rieth, 1950). Occasionally amber beads and polished boars' tusks are found.

Female burials contain no battleaxes. One woman's grave at Oxie, Scania, yielded two bone awls, two flint scrapers, a knife made on a flint flake, and a beaker (Forssander, 1933, 12).

Pottery has been divided into four types (I a - b, II, and III) by Forssander. All, however, are of roughly the same type--rather squat, more or less hemispherical beakers. The type I-a vessels have a slight S-profile.

Trade in flint was obviously one of the major economic activities of the Boat-Axe people. Almost all Boat-Axe burials include flint grave goods, and stray boat-axes are found far beyond the main area of settlement in southern Sweden. Many hoards of flint celts and daggers in the flint-poor North denote well-established trade (Clark, 1948a), although Becker (1952b, 61) has challanged the Boat-Axe monopoly of this activity, at least in northern Sweden. Nothing is known of what was bartered for the flint. Probably the bulk of the goods was perishable animal products such as furs, feathers, hides, whalebone, and dried fish.

In addition to establishing itself on Bornholm, the Boat-Axe Culture also left its mark in the East Danish Single Grave area (Glob, 1948, 89). In the east, there was an important extension into Finland.

In Estonia are a large number of battleaxes related on one hand to Swedish-Finnish types and on the other to East European types (Kyrkpää, 1952, 95). Ceramics are few in number, but resemble East Prussian, Finnish, and Latvian cord-ware. Bone awls, chisels, and clothing fasteners, harpoons, flint axes, and domestic animal bones (cattle, swine, sheep or goat) are known from single graves, which contain either flexed or very

nearly extended interments. The bone harpoons suggest an economic emphasis upon seal hunting, which in turn implies an affinity with Pit-Ware cultures.

Globular Amphorae

Often found with Walternienburg-Bernburg and Cord-Ware are ceramics belonging to the Globular Amphorae culture, which was most at home in the Saale-Elbe region and Havelland, but extended north to Rügen and east into Bohemia and Poland (Childe, 1951, 189-90). Burial customs were flexible to say the least, and most of the material comes from graves. In the case of cists and chambered tombs the Globular Amphorae interments are often secondary. The association with other groups in the graves affords about the only information for establishing the chronological position of Globular Amphorae.

Earth-graves without barrows are found especially along the middle Elbe. Bodies are generally flexed, but crouching postures also occur. Stone cists made of thin slabs are found in Central Germany; a few toward the west have porthole slabs like Seine-Oise-Marne and south Swedish cists (Priebe, 1938). In the north, Globular Amphorae material is associated with chambered tombs, and in Poland, burials are often found in the Kujavian graves. Cremations occasionally appear on the northern fringes of Globular Amphorae distribution. Bones of pig, cattle, elk, dog, deer, and crane commonly connected

with the burials suggest that some sort of funeral feast accompanied interments (Sprockhoff, 1938, 122). Several ritual burials of cattle are cited by Fischer (1956, 156).

The leading ceramic form is, of course, a globular amphora. There are also wide-mouthed pots, hemispherical bowls, and bossed vessels (Warzenbecher). Secondary ceramic forms are Bernburg cups, Michelsberg baking plates, Oder Cord-Ware beakers, and Stichbandkeramik types, all of which aid in dating Globular Amphorae and illustrate its heterogeneous structure. The ordinary globular amphora has a globular body, a cylindrical neck, and two small handles at the neck, while a later version has pear-shaped construction (Fig. 20: a, b). Sprockhoff (1938) suggests the amphorae are clay imitations of organic containers, perhaps pig bladders. From Svendborg in Fünen, Denmark, there is the cylindrical part of a cow's horn with indications of wickerwork at the basel end (Jazdzewski, 1932, 81), which may represent the neck or spout of such a bladder vessel. This may be why globular amphorae are decorated only at the neck and shoulder, and, suitably, the earliest amphorae have neck ornamentation resembling wicker-work.

The primary decorative motifs are linear: chevron bands, triangles, zigzags, cross-strokes, checkerboard patterns, and so forth. However, cord ornament is not at all uncommon, indicating

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Fig. 20. Globular Amphorae ceramics and artifacts.
(After Sprockhoff, 1938.)

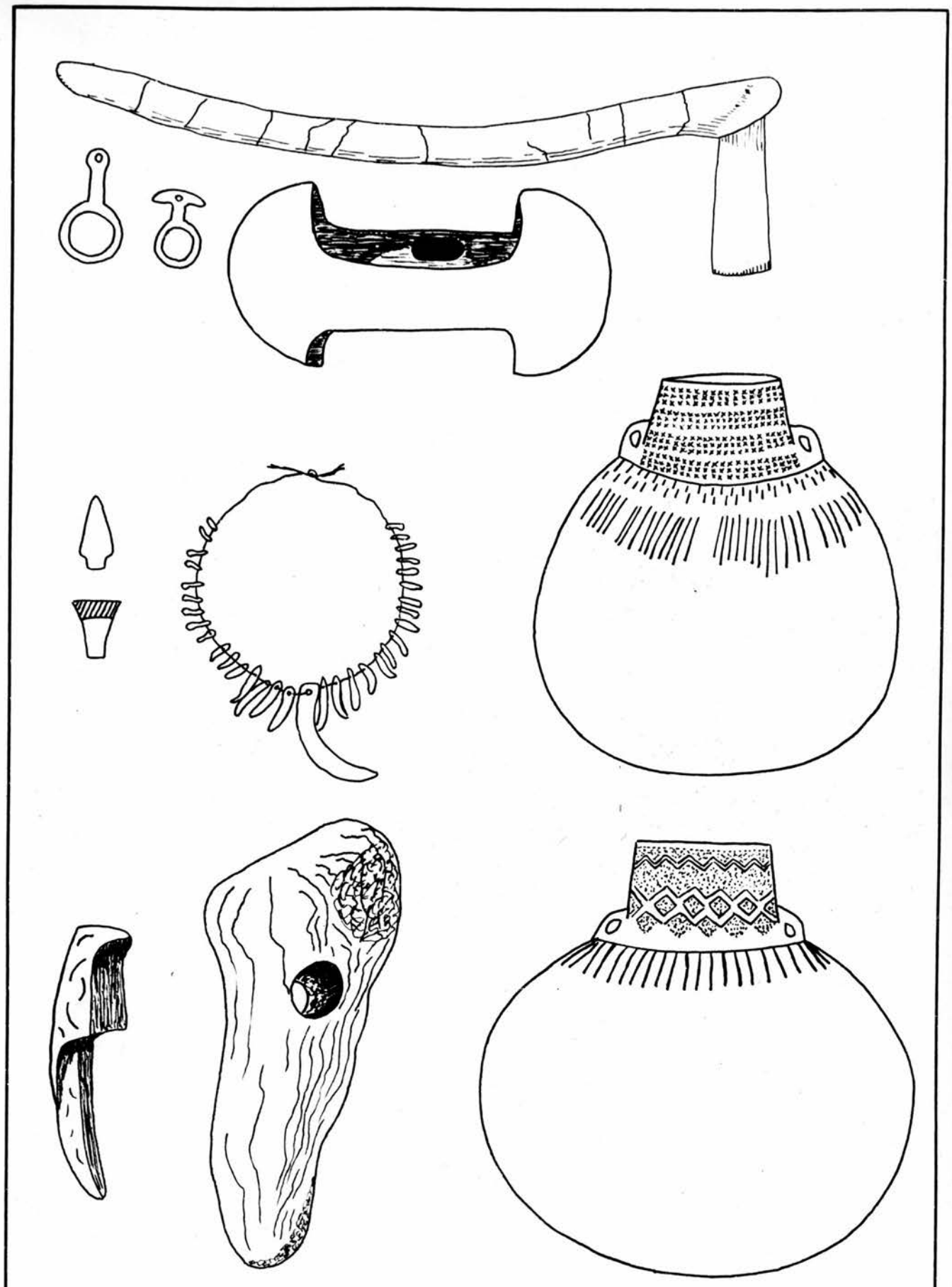

Fig. 20

at least partial contemporaneity with Cord-Ware cultures (Mildenberger, 1953, 69-70).

A great number of implement types are allotted to Globular Amphorae, but most are not peculiar to this culture. Trapezoidal flint axes and chisels have flat blades and small butts. Other flint tools are tanged and transverse arrowheads, spearheads, and (at least on one site) triangular and crescentic microliths. Stone double-axes turn up occasionally. Wooden clubs, antler axes, and bone awls and daggers sometimes occur. Amber beads were commonly used as ornaments; most are round and bored through the center. Bone "girdle plates" were worn east of the Oder (Childe, 1951, Fig. 94), and perforated teeth of bear, fox, wolf, and boar, bone rings, and tubular beads of bird bone also served as ornaments. Bone beads and ring-shaped bone pendants were borrowed from Schonfeld culture (Sprockhoff, 1938, 128-9). Fragments of split boar's tusk often appear in the graves (Priebe, 1938, 46).

The origin of Globular Amphorae culture is as yet a matter for speculation. In spite of its frequent appearance in Central Europe, we know practically nothing of its cultural make-up. According to all indications the Globular Amphorae people were well-armed pastoralists who roamed far and wide over Central Europe, absorbing most elements of their technology from other Neolithic groups and maintaining a good many from their undoubtedly Mesolithic background. They may have been nomadic robber-merchants

(Childe, 1929, 142), just one of many small groups of pastoralists on the European plain during this period.

Globular Amphorae culture is late in the Neolithic sequence, and probably contributed to the Early Bronze Age. Stratigraphical information shows contacts with Cord-Ware and Walternienburg-Bernburg but not with the early Funnel Beaker cultures.

Bell Beaker

This final Neolithic culture is closely associated with the diffusion of metallurgy and need be mentioned only briefly. Presumably, the Beaker people spread into Europe from the Iberian peninsula. Their domain extended from the British Isles and the Baltic to Eastern Europe. Beaker economy rested on the trading of such items as metals, amber, and callafs. As they mixed with, or dominated, local groups during their wanderings, a number of different facies arose.

The characteristic pot form is an S-profiled beaker with alternating comb-marked and plain zones, but various local forms developed out of this basic type. In conjunction with the beakers are found flat-tanged daggers of bronze (and flint derivatives), tanged or hollow-based arrowheads, stone wristguards, stone arrow-straighteners, and V-perforated buttons of various materials. Burial was typically in single graves, but Beaker interments are often found in collective tombs as secondary deposits. Glob (1948, 120) believes the Beaker people were of

great importance in the introduction of metal-working to Scandinavia, as they certainly were elsewhere in Europe. Beaker material begins to appear in Scandinavia during the Middle Neolithic.

In Switzerland, the Chamblandes group appears to have some Beaker affinities. Burials are characteristically in stone cists, although simple earth-graves are known as well. The graves occur in small cemeteries from the Aare down into northern Italy, but the center seems to have been along L. Geneva (Kimmig, 1950, 142).

In Chamblandes graves were placed large flint axes of Western European origin, knives of imported French flint, perforated boars' tusks, V-perforated buttons of Beaker-Remedello type, and hollow-based arrowheads. The chronological position of Chamblandes is no better known than its cultural place, but the grave goods suggest a date very near the Early Bronze Age.

CHAPTER XII

LATE NEOLITHIC

Through the coming of the East Danish Single Grave people, the Funnel Beaker and Cord-Ware groups were merged by the end of the Middle Neolithic. The Late Neolithic was characterized by a much more homogeneous culture, out of which arose the Scandinavian Bronze Age. Relationships with Central and Western European Neolithic cultures, e.g., Seine-Oise-Marne and Horgen, are to be seen in pottery, grave types, and implements (Glob, 1948, 122-3).

The long stone cists used as burial monuments in the Late Neolithic are gallery graves whose origins are not entirely clear. They may merely represent degenerated Scandinavian "T-passage" graves (Daniel, 1941, 19). It is probable that the first Danish stone cists were built by Battleaxe people under the influence of Megalithic tradition (Forssander, 1936, 115). Forssander emphasizes the important role played by the Single Grave group during the interim between the end of the Passage Grave period and the beginning of the Late Neolithic. The Swedish cists appeared later than the first Danish ones. There are two Swedish groups, a southern one and a central one. Among the cists of the Central Swedish group are those designated as the "Skogsbo" type, which have a porthole partition.

Such partitions are quite common in Western Europe, and the ultimate source of the Swedish ones was most likely in the Paris Basin (Seine-Oise-Marne culture), where there are similarities in other cultural features as well (Vogt, 1938, 13, and Forssander, 1936, 158-9).

During the Late Neolithic, flat graves and, in Jutland, single grave barrows continued in use, although the material from them plays a minor role in comparison to that from cists.

Battleaxes of a rather inferior type were still manufactured, but were largely replaced by the type implement of the Late Neolithic--the flint dagger. These daggers are divided into chronological groups I - VI (Fig. 22: a). At first lanceolate in shape (I - III), they progressed to "fish-tail forms" (IV - V) based on Continental Early Bronze Age daggers. Type VI is similar but with a parallel-sided haft. The daggers reflect the high quality flint-work of the period, which was at least partially stimulated by Bronze Age implements.

Transverse and blade arrowheads were replaced by triangular points, among which the hollow-based form is typical (Fig. 22: c). Like the daggers, these are probably of Continental origin. Large numbers of crescentic flint sickles (Fig. 22: b) reflect the importance of cereal cultivation. Flint axes are splayed-edge forms imitating Aunjetitz bronze axes. Slate pendants are

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Fig. 22. Scandinavian Late Neolithic implements and pottery.

(After Forssander, 1936.)

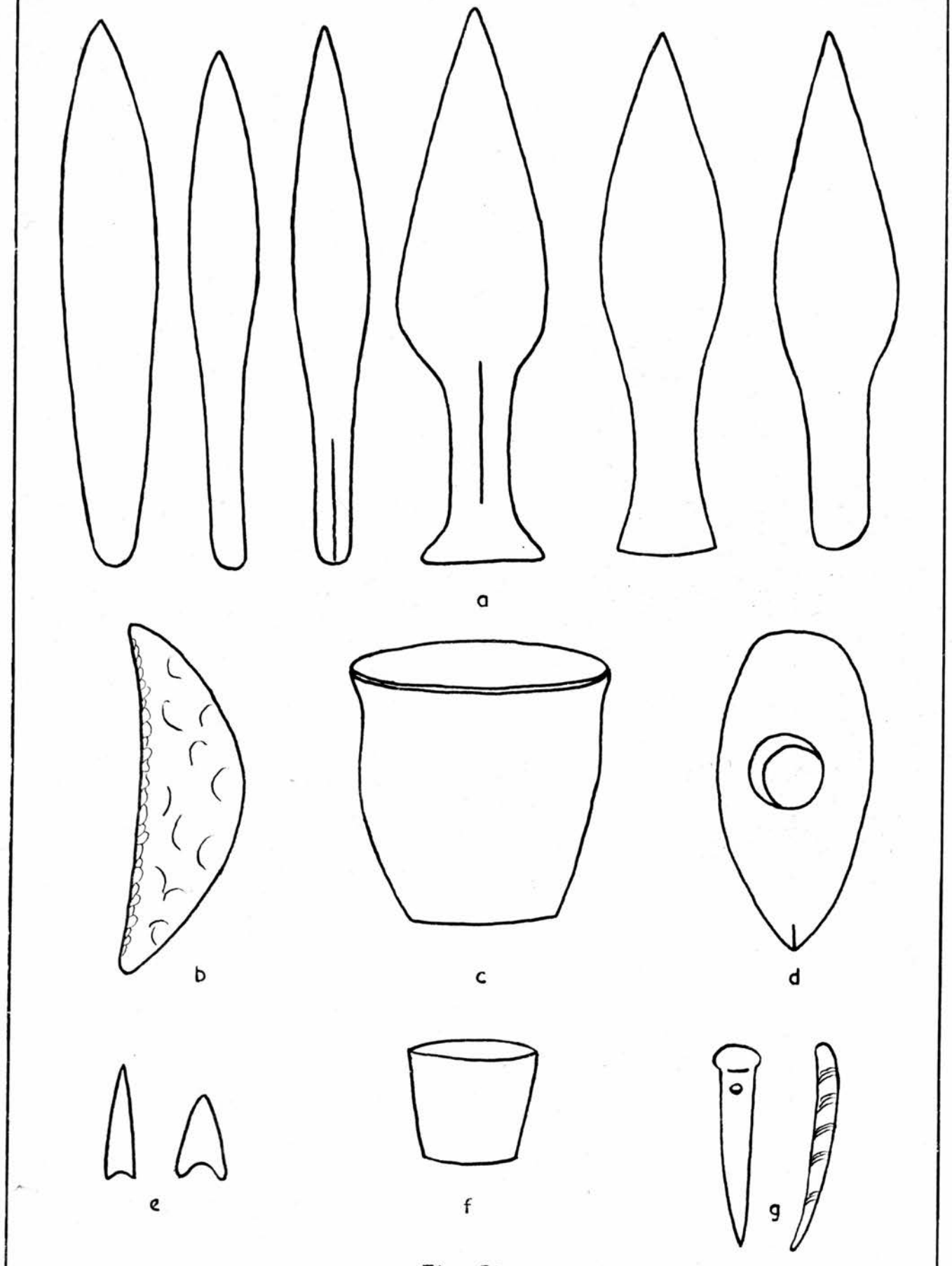

Fig. 22

related to Western types. There are several types of bone needles, one of which is based on Continental bronze needles with splayed heads (Fig. 22: g). Another form has spiral incisions running up the shank (Fig. 22: h).

During the Mesolithic and Early Neolithic, the occupants of Denmark evidently were able to find enough natural flint to pick up most of their supply from the ground or along the beaches. Up until a few years ago, no flint mines were known in Scandinavia, except the ones in Scania which are of doubtful age (Althin, 1951 and 1955). In north Jutland at Aalborg there now have been found pits in the chalk from which a rather poor quality flint was obtained (Becker, 1951b). There were no galleries as at Grimes Graves; the pits were just placed close together and widened at the bottom. Actually, no galleries were needed, since the flint was close to the surface. A hoard of daggers and finds of dagger roughouts suggested a Late Neolithic date. Although a few Middle Neolithic sherds were found in the fill, they may have been intrusive. No pickaxes or antler picks came to light. The poor quality of the flint, from which the long daggers of the Late Neolithic could not have been made, suggests that perhaps other mines will turn up in Jutland. Finds of flint daggers in the Arctic culture-area indicate that flint trade continued during the Late Neolithic (Clark, 1948a).

Although the Late Neolithic people received metal implements and ornaments in exchange for amber, their economy remained

Neolithic. Because of the need for amber for trade purposes, amber rarely appears in Late Neolithic graves (in contrast to preceding periods) and is replaced by trinkets of slate, stone, bone, and copper.

The pottery of the period is coarse, simple ware with little decoration. Almost completely dominating the ceramics is a mortar-like beaker with straight or slightly curved sides (Fig. 22: c, f). The comb-marked ornamentation was perhaps taken over from Oder Battleaxe ware or a related group (Childe, 1951, 194), but the pots themselves appear to belong to a late Neolithic family which includes Seine-Oise-Marne and Horgen, as do the Swedish porthole cists (Vogt, 1938). The exact relationship here is very difficult to determine. Seine-Oise-Marne and Horgen have the appearance of Secondary Neolithic cultures, but the Scandinavian Late Neolithic does not except in its ceramic aspect. This, however, may be partially due to the strong influences exerted by the Bronze Age of the Continent upon Scandinavian culture at this time, which obliterated the earlier Stone Age patterns. The Scandinavian Neolithic persisted up to the Middle Bronze Age of Central and Western Europe, probably until after 1400 B. C. (Childe, 1951, 195).

PART III

ARCHAEOLOGICAL PARALLELS WITH NORTH AMERICA

INTRODUCTION

By including a short discussion of prehistory on the North American continent, it is hoped that additional light will be cast upon the mechanisms of culture in Mesolithic and Neolithic Europe. The earliest American Indians, with a Mesolithic-type culture, adapted themselves to a temperate environment essentially the same as that of Northwestern Europe, and although differing in detail, most of the social, economic, and technological patterns of these hunting and gathering societies were much the same as those we have already considered. In North America, as in Europe, agriculture was introduced from an external source, and there were subsequent interactions between hunters and farmers. It is known that certain contributions from Northern Eurasia entered the New World, but for the most part the cultural phenomena in North America must be treated as independently evolved and independently functioning structures. America is of particular interest because its prehistory extended to the beginning of the 16th century, and as a consequence we have a store of knowledge about the total culture of various Stone Age societies to add to our archaeological information. Comparing these two widely-separated areas of the world is perhaps more in the realm of ethnology than archaeology, but

only in this way does archaeology become a meaningful contribution to the study of human cultural development.

The following material is divided into an areal outline of American archaeology as a point of reference and a general discussion of comparisons with Northwestern Europe (diffusion from the Old World as well as independent convergences and divergences). Emphasis will be placed upon the Eastern United States as the area most closely related to Europe culturally and environmentally. The Southwest culture-area is in many respects a marginal manifestation of the higher centers of civilization in Mexico and Central America and as such will not concern us. The Pacific Coast is relatively little known archaeologically, so any discussion at this general level is necessarily short. Although the Far North has not been very well explored, it belongs to the Circumpolar Stone Age and is therefore of considerable interest. For the sake of brevity, individual cultures will not receive much attention, except in cases where they are of specific interest or have direct bearing on the cultural sequence.

CHAPTER XIII

ANTIQUITY OF THE AMERICAN INDIAN

Although there is a significant amount of variation in physical type among the Indians, all belong to the Mongoloid racial stock. For this reason, it is assumed that the earliest Indians entered the New World in successive migrations from northeastern Asia across Bering Strait, which is by far the most feasible entrance into North America from Asia. Just how long ago the migrations began is not known, but we have some reason to believe that these hunters were present in the southwestern United States 15,000 to 20,000 years ago. In contrast to later periods there was very little heterogeneity among the first inhabitants, or "Paleo-Indians," in the New World. The economy of the Paleo-Indian was based entirely upon hunting, fishing, and gathering. Social groups must have been small and semi-nomadic, although in regions where shellfish were abundant relatively permanent settlements may have arisen. We have little information concerning the material equipment of these early Indians, but traces of such cultures have been found in a number of areas. The best indicators in most cases are well-made projectile points of flint, which probably were spearheads rather than arrowheads.

The best Paleo-Indian sites are on the Western Plains of the United States. The earliest occupation recognized at this time was discovered at Sandia Cave in New Mexico, where the remains of extinct mammals were found in association with a number of distinctive single-shouldered flint points. This Sandia culture lay under a Folsom occupation, and radiocarbon dating suggests an age of at least 20,000 years (Crane, 1956, 670).

The Folsom group, which appears to be the second-oldest American industry, is the most widely distributed of all Paleo-Indian cultures and is dated 10,000 to 12,000 years ago. It was first recognized at Folsom, New Mexico, and subsequently has been found at other sites like Clovis, New Mexico, and the Lindenmeier station in Colorado. The type implement of this industry is a large flat- or hollow-based projectile point with a single long flake taken off each side, so that the cross-section presents a double concave profile. Folsom points have turned up as far east as New York but usually as stray finds. It is unwise to assign too great an age to these discoveries, for there is considerable evidence that such points continued in use during later periods in some areas. In the West, Folsom points are often associated with the remains of extinct fauna and sometimes with other tools. Among the other stone types are flakes, scrapers, knives, large choppers and blades, sandstone shaft-smoothers, hammerstones, grinders and polishers, and palettes for mixing paints made from hematite and ochre.

The larger tools are made on cores, the smaller ones on flakes. Pressure-flaking was used as well as percussion-flaking. Articles such as awls, needles, spatulas, and tubular beads were made of bone, and some were decorated with simple geometric designs.

In Arizona and New Mexico, the Cochise culture represents a population of considerable antiquity which lived on game and wild plant products. The leading artifacts are flat milling-stones and small hand-stones for grinding edible roots, seeds, nuts, and other vegetable products, showing that the Cochise people concentrated on gathering rather than hunting, in contrast to Folsom.

A number of other Paleo-Indian industries have been recognized, but most, like Folsom, are known primarily by projectile points and will not be treated here. Let it suffice to say that the first Americans were semi-nomadic hunters and gatherers with distinctive flint types, among which large projectile points (probably used with spear-throwers) are characteristic. The Paleo-Indians, like their successors, were undoubtedly Mongoloids of Asiatic origin. No certain sites of this period have yet been found in the North, where we would expect to find the earliest indications of these people, but with the intensification of archaeological exploration such sites probably will appear.

CHAPTER XIV

EASTERN UNITED STATES AND THE PACIFIC COAST

Eastern United States

The general culture sequence in the Eastern United States (Griffin, 1952a) is as follows: Paleo-Indian, Archaic (Early and Late distinguishable in some regions), Early Woodland, Middle Woodland, and Mississippi. During the Mississippi period, many Middle Woodland traits continued in the North and East, producing a Late Woodland complex in these areas. These terms vary in applicability according to area. The Middle Woodland and Mississippi phases in particular were clearly centered geographically and were virtually absent in certain marginal regions.

Archaic

During the Early Archaic period, small hunting groups ranged over fairly well defined areas, and in northern Alabama, the Northeast, and elsewhere, large middens were raised by shellfish-gatherers. There probably were no specialized roles or crafts within the society. The atlatl, or spear-thrower, and possibly bows were used for hunting. Fish were caught with hooks and gorges, and vegetable products were gathered and ground on mortars with hand-stones or pestles. Food was cooked

by roasting or dropping heated stones into organic containers. The large numbers of bone awls and needles suggest skin clothing was worn. Although floor areas have been discovered in some middens, we know little of the housing. Basketry was probably made, but there is little evidence of it.

At this time, few if any polished stone tools were made, but bone was cut, ground, and polished. The larger stone tools consist mostly of large flaked axes and choppers. In certain regions like the Florida coast, shell gouges and celts replaced stone. Projectile points and other small implements were produced by percussion and pressure-flaking.

Burials were usually flexed and placed in the habitation area, often interred very casually or in old storage pits. Secondary and bundle burials, as well as occasional cremations, occur. So far as we can tell there was not yet any elaborate ritual connected with death. Dogs were often accorded burial with humans, a practice which ceased by Woodland times.

The Late Archaic is characterized by the appearance of polished stone tools: celts, full-grooved axes, boatstones and bannerstones (atlatl weights), and tubular tobacco pipes. There is increased evidence for the use of shell ornaments, which often bear incised designs. Painted decorations were placed on bone implements. Bowls cut out of steatite or sandstone reached a high level of development. Barbed bone points and stone plummets used for fishing appear in the North,

but only the latter diffused into the South. In the far Southeast, shell continued in use for implements as well as ornaments. The production of artifacts from human skeletons was unique; skull cups and gorgets cut from crania are especially common. Combs, spoons, and cups were made of antler, and shamans wore antler headdresses.

No culture in native North America ever reached a true metal age, but copper was widely used even at this stage. Nearly pure copper was gathered or mined by the Indians in the Lake Superior region and traded into Canada, New England, and the South. Exactly which group or groups worked the deposits and transported the copper is as yet undetermined, but it was carried out on a large scale. Although sometimes annealed, copper was never smelted or cast but treated purely as malleable stone, and for this reason we can not speak of a Copper or Bronze Age in North America.

The growing interest in burial is reflected in the Glacial Kame culture of the lower Great Lakes, in which cremated or flexed bodies were interred with copper beads, red ochre, and marine-shell artifacts in glacial deposits (Cunningham, 1948).

In New York appears a group of Archaic cultures (Ritchie, 1944; MacNeish, 1952; Martin, Quimby, and Collier, 1947) which seems to be connected with the Circumpolar Stone Age. The Lamoka, Frontenac, Laurentian, and Brewerton cultures possess such implements as narrow-stemmed or side-notched points, crude

choppers, beveled adzes, plano-convex adzes, gouges, heavy grinding implements, and net-sinkers of stone. Crescentic knives and projectile points were manufactured out of ground slate. Copper was used at an early level for awls; gouges, axes, and gorges of metal appeared later. A wide variety of artifacts was produced from bone: awls, needles, fishhooks, double-pointed pins and gorges, chisels and scrapers, whistles, gouges, knives and ulna daggers, barbed and perforated harpoons, spearheads, and worked animal jaws. Made of antler are shaft-straighteners, combs, notched pendants, conical points, and spoons. Hafted beaver incisors served as cutting tools. Beads, pendants, and receptacles were made of shell, and perforated animal teeth were worn as ornaments. Many of the bone and antler artifacts bear simple incised or painted designs.

All of these New York cultures are demonstrably pre-agricultural and pre-ceramic. Radiocarbon results suggest the Eastern Archaic is 4,000 - 5,000 years old (Griffin, 1952b, 368). The people shifted their dwelling sites at least seasonally; during the summer larger communal groups may have congregated in villages (Martin, Quimby, and Collier, 1947, 243).

Early Woodland

The Early Woodland period was ushered in by no drastic changes in economy (Griffin, 1952a, 356), and in many areas, such as the lower Mississippi Valley (Jennings, 1952, 257), there is in fact no clear line of demarcation between Archaic

and Early Woodland. The basic new traits were the erection of burial mounds and the introduction of pottery, accompanied by changes and specialisations in projectile points, tobacco smoking, elaboration of polished stone forms, the appearance of finely woven cloth, and a tendency for the full-grooved axe to become three-quarter grooved. Copper was used much more for ornaments than for tools.

Pottery probably was first introduced in the Northeast, where it is a coarse, granular-tempered ware with plain surface or cord-markings. In the south-central region, vessels are plain or cord-marked but more often fabric-impressed. Here appears most frequently the Woodland "flowerpot" shape. This pottery is coil-built and sometimes bears paddle impressions. Along the Atlantic coast steatite-tempered pottery suggests a gradual shift from stone vessels to ceramics. In the far Southeast pottery is fiber-tempered and retains the shapes of stoneware. The lower Mississippi Valley has the Woodland flowerpot form placed on tetrapodal feet. It is suspected that the Northeastern pottery, and possibly the burial mounds, are of northeast Asian origin (McKern, 1937). The ceramics in the south may have been derived from the North through stimulus diffusion.

Burial mounds seem to have appeared first in the Northeast also, from whence they spread into the Southeast and lower Mississippi; south of the Arkansas and west of the Mississippi mounds were lacking throughout the prehistoric period.

During the course of Early Woodland, small clusters of dwellings appeared on arable land, showing increased emphasis on farming. We have no definite evidence of agriculture, but it probably did contribute to Early Woodland (though it may not have entered some regions until Middle Woodland). Interment within the family house illustrates the growing importance of burial rites. The mounds, many of which are huge tumuli, and large geometric earthworks reflect social stratification and the importance of ceremonialism. Inter-cultural commerce continued to expand; possibly some groups or individuals were trade specialists.

The cultural center of this stage was in the central Ohio Valley (Morgan, 1952), where the Adena people built burial mounds and bank-and-ditch enclosures. Villages usually consist of two to five houses, a number of these then making up larger units spread over a considerable area. The houses are circular structures over 35 feet in diameter, the walls formed by a double row of inward-slanting posts.

Adena mounds usually occur in groups and are subconical earth structures which vary in height. The elaborate burial customs in which these mounds played a part were for the more important people only. The most highly regarded individuals were placed as primary burials in log tombs within the mounds, while cremation or secondary burial was accorded those of lower status. Burials often occur on house floors or in sub-floor graves; others were placed in partially constructed mounds and then covered with

earth. Small mounds were built over house burials and the house burned. Some mounds were erected over a period of time. Those dead buried in the flesh were dorsally extended in simple floor graves, earth-walled tombs, or log tombs. Separate skulls were placed with burials or interred alone.

Log tombs were rectangular, and some had passageways suggesting the bodies were left accessible for a period of time. The tombs often were burned, either accidentally or intentionally.

Cremations took place in circular clay basins, whereupon the ashes either were left and covered with clay or a log tomb or else gathered up and deposited in mounds, in villages, or with extended log tomb burials. Ritually "killed" artifacts were burned with the body or deposited with the ashes.

Pottery was not buried with the dead but is found elsewhere. Small flat- or round-based pots predominate, but four-legged vessels also occur. Most have slightly flaring rims with a thickened rim strip or rim nodes. The surface was left plain, cord-marked, or incised with diamond designs.

The Adena stone inventory includes stemmed and notched points, ceremonial leaf-shaped blades, polished axes, scrapers, drills, and so forth. Other tool types are antler flint-working implements, antler points and handles, bone spatulas, turtle-shell spoons, mussel-shell spoons and hoes, bone awls, and a few copper axes. Ornaments are numerous: slate gorgets; beads of shell, copper, bone, and pearl; copper bracelets, rings, pendants,

and gorgets; circular cranial gorgets; designs cut from mica; circular earrings worn in pierced and extended ear lobes; engraved stone tablets; and two-part bone combs. Tubular stone pipes were more common than platform and elbow types. Clothing was made of skin and fabric, and several weaving techniques were known. Adena skulls are often bi-frontally flattened, and occipital flattening was almost universal.

The earthwork enclosures are square, rectangular, or circular in layout. The circular type, which is most common, varies in diameter from 50 to 500 feet. These have a gateway and interior ditch which was partially formed by removal of earth for the embankment.

The Adena people were sedentary, although hunting and gathering probably were at least as important as agriculture.

Adena has been regarded in the past as ancestral to Hopewell (Middle Woodland of the same area), but radiocarbon dating has confused the relationship (Griffin, 1952b, 368-9). The earliest date for the beginning of Hopewell previously accepted was c. 500 A. D.; the highest carbon date is about 380 B. C. The most recent radiocarbon dates indicate Adena overlapped Hopewell in time (Johnson, 1957, 242).

Middle Woodland

This period is characterized by material belonging to Ohio Hopewell, which in its broader manifestations is termed Hopewellian. The two major centers are in the central Ohio Valley

and in the Illinois Valley (including the adjacent Mississippi Valley). Other centers are in the Kansas City area and northeastern Oklahoma, the lower Mississippi Valley, and Florida. Specific Hopewell traits can be recognized all over the Eastern United States.

The Hopewell people (Morgan, 1952) built huge geometrical earthworks and hilltop enclosures, or "forts." The earthworks were built in valleys and include circles, rectangles, and octagons, or combinations of these. At the larger sites such structures may be connected with long parallel walls, which are periodically broken with openings. Burial mounds usually are associated with the earthworks and are sometimes within them. These vary in size and shape from small conical mounds to large, elongated mounds 30 feet high and 240 feet long. The enclosures were used as religious, social, and burial centers and were probably operated by some sort of priesthood.

The "forts" are typified by Fort Ancient on the Little Miami River in Ohio. Such sites, mostly in southwestern Ohio, have earth or stone walls enclosing relatively level hilltops which are isolated by steep valleys or ravines. Occasional mounds are found near or within the enclosures, which were ceremonial centers as well as fortifications.

Hopewell culture is known primarily through its elaborate burial customs. Both utilitarian and ceremonial pottery are known, but neither was often buried with the dead. All pots

are without handles and most are gray or buff in color. Decoration consists of cord-wrapped paddle-marking, stamping, and incising. The rims usually are thickened and decorated with cross-hatching bordered by punctations. A common treatment was to cover the entire surface with a stamped design or with curvilinear zones of stamped impressions set off from plain areas by incised lines. Other ceramic goods are platform pipes, button cores to be covered with copper, beads, circular ear ornaments, and human figurines.

Hopewell tools, weapons, and ornaments reached a degree of design and craftsmanship never excelled in the Eastern United States. Almost certainly there were specialized artisans who worked in perishable substances like wood, leather, and feathers as well as in stone, clay, shell, metal, bone, and antler. Points, scrapers, knives, and drills were made of local flint. The projectile points include triangular, notched, stemmed, and leaf-shaped forms. Very large ceremonial blades were produced out of obsidian, quartz, and flint. Conical points of antler or copper also occur. Chisels were pounded out of both copper and meteoric iron, as were axes and adzes. Polished axes were made of very hard stone. Stone bowls and cups are rare, but containers of wood and conch shell were commonly used. Bone implements include needles, awls, chipping tools, skewers and pins, spatulas, and digging tools.

Ornamental work was particularly well developed: shell and pearl beads; copper, stone, and bone beads; animal canine or claw pendants; carved bear canines (sometimes set with pearls);

copper earrings, bracelets, rings, and combs; headdresses; copper earspools; scrolled or bossed copper breastplates; bird-effigy copper gorgets; pendants of a variety of materials; stone gorgets and animal-effigy boatstones; human as well as animal jaws cut and perforated for suspension; designs cut from mica and copper for attachment to clothing; hollow copper turtle-effigy platform pipes; and rare sheets of gold. This gives some idea of the almost infinite variety of materials and artifacts used by the Hopewell people and shows why there must have been craft specialists.

Weaving was well developed, but there is no proof that even simple looms were in use. Rabbit hair and plant fibers were most commonly woven into fabrics.

Hair styles and clothing are known from human representations in art. In addition to a high incidence of cranial deformation, ear lobes were pierced and distended for ornaments and faces painted and tattooed.

Tombs were circular or rectangular structures within the mounds, where both log tombs and stone-slab graves were used for extended burials. Cremation accounts for 75% of the burials, and most of the bodies treated in this manner were defleshed and dismembered before burning. Bodies may have been exposed for some time on scaffolds, as among certain historic tribes. Burials were either single or multiple. Ritual offerings also were placed on platforms or repositories separate from the tombs.

The Hopewell Indians lived in permanent villages, supplementing agriculture with hunting and gathering. Trade connections extended from the Rocky Mountains to the Atlantic Coast and Florida. Commercial expeditions may have been sent out from the Ohio center.

In Wisconsin appeared the Hopewell-type Effigy Mound culture (Bennett, 1952) in which were built domed, linear, and effigy mounds. Burials were placed in the center of domed mounds, on the long axis of linear mounds, and at focal points (such as the heart area) of effigy mounds. Stone cists and stone paving are often associated with the burials. In the lower Missouri Valley, stone-built chambers, sometimes with passages, under mounds are assigned to Early and Middle Woodland (Chapman, 1952, 141 and 143).

Mississippi

This horizon brings us nearly to the Historic period. It begins with the appearance of temple mounds in the Southeast and was of Mexican origin. The great Mississippi centers fall roughly on a line from north-central Georgia through northern Alabama, northern Mississippi, western Kentucky, southern Illinois, and into southeastern Missouri. There is evidence of a population increase and intensification of agricultural activities although hunting and gathering still contributed to the food supply. Polychrome painting and engraving were now used as decorative techniques on pottery, and many new pot forms appeared, including

animal effigies. The best known artifacts belong to what is known as the Southern Cult.

The temple mounds are truncated pyramids on top of which were built some sort of temples or council houses. The mounds were grouped around a central plaza, and a village (often palisaded) surrounded the plaza. The mounds were re-built at intervals, which were perhaps ritually regulated as in Mexico. Many of the pyramids have ascending ramps or staircases. Some burials may be found in the mounds, but they were no longer primarily tombs. These villages were not independent city-states in the same sense as Near Eastern ones.

Commoners were interred in cemeteries, but those of high status might be accorded burial in the temple mounds. Burials were primary (extended or flexed), secondary (defleshed), or cremated. Several types of stone vaults surmounted by mounds were used by some Mississippi Indians.

The Southern Cult ("Southern Death Cult," "Buzzard Cult") flourished during the late Mississippi period. The exact meaning of this ceremonial complex is unknown. The most common explanation attributes it to the Spanish conquest of Mexico or the DeSoto Expedition through the Southeast, which threw the Indians into the state of panic and defeatism. However, Fairbanks (1952, 293) believes the Cult's height preceded Cortés and that it was not primarily a death cult. In any case, the basic pattern for such a cult was present in Hopewell (Martin, Quimby, and Collier, 1947, 362), although some traits of Mexican origin contributed

to the short-lived Southern Cult. Among traits of the Southern Cult (Ibid., 363) are monolithic axes (head and haft of a single piece of stone); ceremonial clubs or batons; shell pendants with the backgrounds cut out to form crosses; conch-shell masks with winged or weeping-eye symbols; shell gorgets with spider, woodpecker, and rattlesnake motifs; ceramics modeled, painted, or engraved with skulls, serpents, crosses, etc.; large stone figures with Negroid features; elaborate headdresses; ear-plugs and earspools; ceremonial celts; copper masks; and other similar objects.

In Alabama the decline of the Mississippi period was marked by the disappearance of mounds and many of the "Cult" symbols and the appearance of urn burial (DeJarnette, 1952, 283-4). The urns are very large, usually covered, and placed in cemeteries. The bodies were defleshed before burial. One or more individuals occupied an urn, and objects of European manufacture often appear as grave goods.

The Mississippi period was at its height when early Spanish and French explorers entered the country, and therefore we know something of the social organization, language, and tribal relationships (Griffin, 1952a, 362-3). Most Southeastern tribes were matrilineal, matrilocal, exogamous totemic clans, and many were further divided into exogamous moieties as well. There is some evidence that certain groups had rigid class or caste distinctions. Political power was vested in the tribe and

concentrated in the hands of a head chief or upper-class council. Political office was inherited through the female line. The tribal chief in some groups was the chief priest as well as the civil and military leader. In other tribes the three roles were held by different individuals. Warfare was ordinarily carried on only for blood revenge and not for territorial acquisition.

North of Ohio, relatively few Mississippi traits are in evidence, and the basic Woodland patterns continued through the early historic period. The Late Woodland complex was a period of quiescence following the Hopewell climax. In some areas Late Woodland was co-existent with Early Mississippi and contributed to Mississippi development.

The Pacific Coast

California

California can be very quickly summarized. No agriculture was ever practiced except along the Colorado River, where influences from the Southwest entered the region. Acorns formed the basis of the economy in south and central California. In the northwest, acorns were augmented by fish and shellfish, and in the Santa Barbara area, sea-mammal hunting was important. Pottery was confined mostly to the desert regions and is also attributable to Southwestern influence.

Northwest Coast

This culture-area extended from northern California to southern Alaska. At the time of discovery, the following traits

were noted: a basically similar hunting and fishing economy; extensive use of wood for art, canoes, dwellings, and utensils; preference for bone, horn, and shell instead of stone for implements; high development of basketry; no pottery or agriculture; lack of extensive political organization.

The Northwest is not well known archaeologically, for few of the village sites, cemeteries, and middens have been carefully investigated, but it is quite certain that the differences between the prehistoric and the historic cultures were slight. The origins of the Northwest Coast cultures remain obscure.

Large settlements were occupied during the winter, and in other seasons extended family groups lived on smaller sites while hunting and gathering activities were pursued.

Implement types include plain or barbed bone points; single-piece and composite bone harpoons, slate projectile points; stone chisels hafted in antler sleeves; adzes and chisels of stone bone, and shell; grooved mauls and hammers; bone, slate, and shell knives; and wedges, awls, drills, scrapers, and gouges of bone. Many of the tools obviously were used for woodworking.

Burials are usually in middens. In the north and central areas, the dead were sometimes placed in boxes, and in the south, interment in stone cairns also occurred. Cremation was not unknown.

The lack of archaeological knowledge must be due in large part to the preference for organic materials, which swiftly

disappear in such a damp climate. Most of our information concerning the prehistoric cultures only can be inferred from historic evidence.

CHAPTER XV

THE FAR NORTH

This part of the New World was closely associated with Northern Eurasia, for most of the outstanding traits in Eskimo cultures seem to have been derived from the Mesolithic and Sub-Neolithic cultures of the Eastern Hemisphere's Arctic and Boreal Forest Zones. The prehistoric Eskimo cultures have no great antiquity (most of those so far recognized hardly could be more than 2,000 - 2,500 years old), but the time-gap is accounted for by the marginal position of the area and the retention of equipment well adapted to an Arctic environment.

The two primary prehistoric Eskimo areas are the Western (Bering Strait) and Eastern (eastern Canada and Greenland). The Eastern Eskimo cultures are Dorset and Thule, both of which originated in the Western area. In the Bering Strait region are the Cape Denbigh Flint Complex, Okvik, Old Bering Sea, Punuk, Birnirk, Ipiutak, and a number of groups in the Aleutians, similar to the Alaskan cultures but with more seafaring and little adaptation to ice and snow conditions.

Western Eskimo

Of Gjessing's (1944) two Circumpolar strata--coastal and interior--only the first is very well known archaeologically or

historically. The inland regions only recently have been explored, and the inland Eskimo have tended to move out to the coasts because of whaling, missions and schools, and the reduction of caribou herds through the use of firearms (Larsen and Rainey, 1948, 24). Therefore, all the cultures discussed below are primarily coastal manifestations.

The Cape Denbigh Flint Complex

At Cape Denbigh, Norton Sound, Alaska, a microlithic assemblage was found which seems to be the oldest culture represented in the North. The Cape Denbigh industry (Giddings, 1951) has definite Mesolithic affinities: polyhedral cores, lamellar flakes, and tiny blades; blades of "generalized Folsom-Yuma (Paleo-Indian) types"; and burins. This complex is considerably older than what usually is called Eskimo, but there probably is some connection with the later Eskimo cultures and possibly with early Indian cultures as well. Collins believes certain Cape Denbigh traditions (lamellar flaking, burins, and blade insets) may be traced into Dorset (Collins, 1951 and 1953a).

Okvik - Old Bering Sea - Punuk

Okvik is generally considered as an early stage of Old Bering Sea, so these two may be treated as a unit. Old Bering Sea represents the earliest stage of Western Eskimo development, but nevertheless it was a complex culture characterized by excellent artistic expression. The Old Bering Sea people lived in sedentary villages of semi-subterranean dwellings and hunted

walrus, seals, fish, and birds. A limited amount of whaling may have been carried on. Dogs were kept and eaten but not used for drawing sleds. The sole ceramics were saucer lamps and deep, round-bottomed cooking pots with simple stamped decoration. A wide variation in tools and utensils was produced: harpoons and lances, bows, spear-throwers, bird darts (bone or ivory points with inserted flint blades), bone and ivory hooks, ivory ice-picks, leisters, walrus-tusk picks, shoulder-blade shovels, whale-rib mattocks, bone drills and awls, bone needles, stone knives and adzes, scrapers and drills of stone, skin boats, and sleds. Many of the artifacts are decorated with geometric or naturalistic engraving.

The earliest part of Old Bering Sea (Okvik) has a radiocarbon date of 2258 years (Collins, 1951, 430), and Old Bering Sea proper goes back to about 1 A. D.

The Punuk economy was basically like that of Old Bering Sea. New traits are bone and ivory plate armor, bird bolas, whaling harpoon-heads, bone and ivory daggers, wristguards, iron engraving tools, and a greater use of slate implements. Most of these new features were probably Siberian in origin (Martin, Quimby, and Collier, 1947, 485). Collins (1951, 431) suggests that Old Bering Sea and Punuk occupations may have been even heavier on the Siberian side of the Strait.

Birnirk

Information concerning Birnirk is rather scanty, but this complex appears to represent a link between the Alaskan cultures

and Thule in the Eastern area. Birnirk is most often quoted as the ancestor of Thule. Its exact chronological position is undetermined; it is probably somewhat later than Old Bering Sea and earlier than Punuk, but overlapping both. Birnirk villages were made up of rectangular driftwood houses covered with sod. Tools included bows, stone and bone projectile points, wrist-guards, multiple-pronged bird-spears, spear-throwers, bolas, slate knives, bow drills, flint scrapers, antler adze-heads with slate blades, clay lamps and cooking pots, and eating utensils of wood, horn, and antler. Multiple burials were placed in sod-covered grave houses, where the cold preserved the bodies.

Ipiutak

Ipiutak culture (Larsen and Rainey, 1948) was first recognized at Point Hope, 125 miles north of the Arctic Circle in western Alaska, and other sites now have been located on the Seward Peninsula and at Kuskokwim Bay (Larsen, 1952, 29). Point Hope is a remarkable site consisting of several hundred houses arranged along regular avenues. Possibly the village was not occupied the year around, but even then the food supply must have been abundant to allow the growth of such a large habitation. Larsen and Rainey think the Ipiutak hunters were an inland people who lived on the coast only in summer, but this has been challenged by Collins (1951, 432).

The Ipiutak economy was based on hunting land and sea mammals, as well as fishing and fowling. Whaling seems to have been neglected.

Weapons are characterized by well-made blades inserted in the sides of projectile points. Flint was more extensively used than ground slate, and only adzes and transverse chisels were made of ground stone. Ipiutak contains a large number of widespread Eskimo traits, but the closest parallels are found in Okvik - Old Bering Sea. Several typical Eskimo features, however, are absent: pottery, lamps, sleds, ground slate, and whaling. Because of this, Larsen and Rainey believe the Old Bering Sea complex developed out of Ipiutak. Unfortunately, radiocarbon dating has upset this theory, for two Ipiutak dates of 900 - 1,000 years have been obtained. Collins (1953b, 198) feels the samples may have been contaminated by grass-roots, however.

Ipiutak art includes a great deal of ivory-carving in the round. Animals and animal heads were favorite motifs, a feature reminiscent of Scytho-Siberian art styles. Another common element was the use of skeleton motifs. Geometric ornamentation as well as naturalistic occurs on bone, antler, and ivory. Among the engraving tools were hafted squirrel incisors.

Burial customs among the Ipiutak were surprisingly elaborate. Two types of burial were discovered in the environs of the Point Hope site. The first was interment in log coffins deeply buried in the ground. The corpse was extended with the hands placed in the pelvic region, and few grave goods ordinarily were deposited in the coffin. The second type was a surface burial of scattered bone and wood fragments with accompanying grave goods. The

original appearance of these graves was impossible to ascertain. Each of the surface burials formed a unit, and several units sometimes were arranged in long straight rows. Characterizing the grave goods were elaborate openwork carvings of ivory. Two animals, a dog and a loon, were accorded human burial.

Eastern Eskimo

Dorset

Dorset seems to be nearly as old as Old Bering Sea. Its origins must be sought in the early Alaskan cultures, probably in the era preceding the full growth of Old Bering Sea (Jenness, 1941, 390; Collins, 1951, 428). Dorset does lack a number of distinctive Eskimo traits, such as dog traction, snow shovels, wide use of slate, bone arrowheads, and bow drills (Collins, 1953a, 32). They were expert flint-workers and possessed a distinctive geometric art style. The Dorset people hunted land and sea animals but not whale. They probably had no pottery, but stone pots and lamps were used.

Dorset undoubtedly preceded Thule, but there is evidence that the two co-existed and influenced each other for some time.

Thule

The Thule Eskimos were whalers who also hunted other sea mammals. In its late phase (Inugsuk), Thule came into contact with the medieval Norse settlers of Greenland. Thule villages were coastal settlements of semi-subterranean houses. Crude

pottery was made occasionally. In addition to a number of harpoon types, these people used bone and ivory icepicks, lances and bows, blunted arrows, arrowheads of bone, ivory, and stone, bolas, animal traps, ice scoops, spear-throwers, fishhooks, leisters, bone or wood snow shovels, ulus and "men's knives" of ground slate, stone adzes, bone wedges, bone mattocks, bow drills, bone needles, stone lamps and cooking pots, dog sleds, and bone and ivory ornaments. Art consists of stylized bird figures, human figurines, geometric engraving, and a certain amount of pictographic design. Burials were placed in stone cairns, the bodies fully clothed and accompanied by grave goods.

The Thule Eskimos were spread across a vast area, from northern Alaska to Greenland. The origin of Thule appears to be in Birnirk or a related group. Thule Eskimos put more emphais upon sea-mammal hunting and used far more specialized implements than the earlier Dorset inhabitants, who were acculturated or driven off by the Thule people.

CHAPTER XVI

CULTURAL CONTACTS WITH NORTHERN EURASIA

Paleo-Indian

The earliest Indian cultures were derived from a late Palaeolithic or Mesolithic background in the Old World, but no one so far has been able to demonstrate affinities with any particular Asiatic industries. The sparsity of knowledge concerning early lithic horizons in northeastern Asia has been sufficient to keep most archaeologists from tackling the problem seriously.

Archaic and Early Woodland

Spaulding (1946) has drawn attention to the significance of the Northern Forest Zone to both Old and New World archaeology. The Forest Zone imposed ecological restrictions upon all aboriginal cultures and offered about the same resources in each hemisphere. At the same time as it encouraged diffusion by its lack of natural barriers and similarity of resources, it acted as an effective insulator between the higher cultures of Asia and America. Agriculture was impossible, and hunting and fishing therefore were the chief economic activities. In these economies, basic cultural unity always outweighed local specialization.

Actual inter-continental connections are hard to prove because of the immense gap between Northern Europe and the Northeastern United States which is almost unknown archaeologically; but there are enough similarities even in European and northeastern American heavy stone industries, bone-work, pottery, and slate tools to illustrate some type of cultural contact.

The so-called "Red Paint" culture of Maine and the Archaic cultures of New York exhibit many features which also appear in the Stone Age of Northern Eurasia. In a companion article to Spaulding's, Ritchie (1946) points out the fact that both Laurentian and the following Early Woodland ceramic complex probably arose as a result of diffusion from the Old World. It now seems virtually certain that these features were not introduced via the Eskimos, who must have arrived on the scene much later. Any borrowing would have been in the opposite direction (Collins, 1953a, 38). Gjessing (1953) in fact shows that the Eskimos did not adopt most of the primarily Forest Zone traits, and thus there must have been an earlier wave of diffusion into the New World. In view of this, he believes the use of slate was introduced twice into North America. However, the earliest Eskimos used little slate and probably began the change from stone to slate after contact was established with the Northern Forest Indians.

A number of Maglemose-Circumpolar Stone Age traits are paralleled in the Eastern United States Archaic and Early

Woodland periods. Among the stone types are heavy woodworking tools such as axes or choppers, adzes and gouges (Fig. 23: e, h); slate projectile points (Fig. 23: j) and crescentic knives; crescentic stone knives or "sickles" (Fig. 23: l); and grooved axes. Grooved axes and mauls are relatively rare in Northern Europe but do occur in Sweden (Montelius, 1922, Fig. 244-56), Norway (Gjessing, 1945, Fig. 71: 1), and Poland (Jazdzewski, 1936, Fig. 436). The Swedish examples are three-quarter grooved as well as full-grooved. The slate knives include a type very similar to Norwegian "boot-shaped" implements, on which the haft or stem comes down vertically on a crescentic cutting edge (Fig. 23: i). The techniques of working and decorating bone ultimately can be traced to the Old World Mesolithic along with many of the actual artifact types. Parallel bone and antler forms are awls, needles, double-pointed gorges (Fig. 23: c), fishhooks (Fig. 23: b), ulna daggers (Fig. 23: d), polished knives, scapula scrapers, barbed bone and antler points (Fig. 23: a), plain or tanged bone points (Fig. 23: n), conical antler points (Fig. 23: k),

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Fig. 23. Northeastern Archaic and Woodland.

a. barbed bone and antler points
b. bone fishhook
c. bone gorge
d. ulna dagger
e. rectangular adzes
f. antler pick
g. bone comb
h. stone gouges
i. "Boot-shaped" implement
j. slate arrowheads
k. conical antler point
l. crescentic flint tools
m. side-notched endscraper
n. bone arrowhead

(After Gjessing, 1944; Ritchie, 1944.)

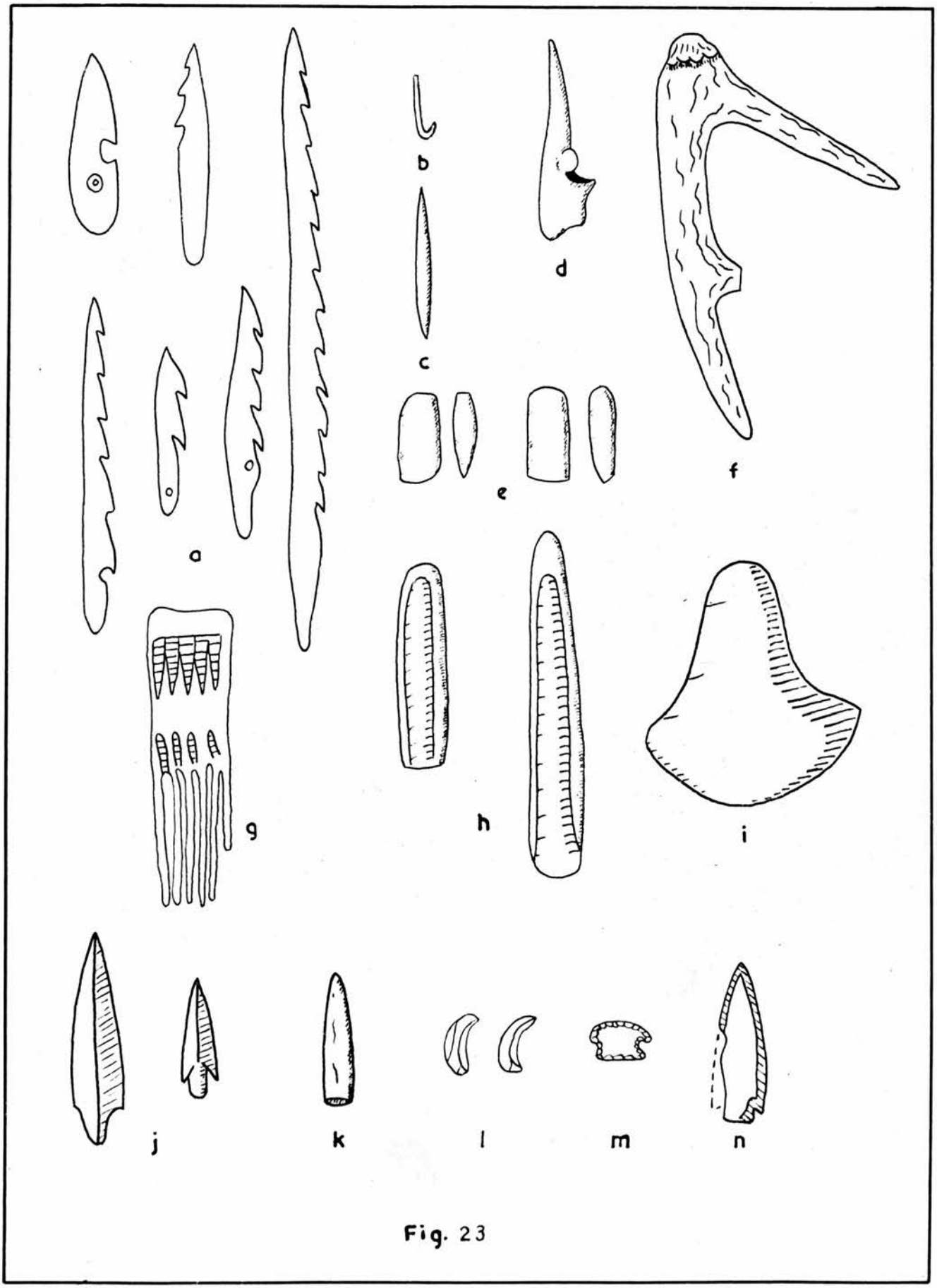

Fig. 23

shaft-straighteners, combs (Fig. 23: g), gouges and chisels, antler picks (Fig. 23: f), and antler headdresses. Notched antler pendants are ascribed to the Archaic as well as to Western European Neolithic cultures. Split beaver incisors and rare bone whistles of Maglemose (Clark, 1936, 110 and 113) also occur in the Eastern United States.

In north Scandinavian rock-drawings, animals often are portrayed with a heart connected to the mouth by a line. This "heart and life-line" motif is common throughout the Circumpolar area, including large parts of North America (Gjessing, 1944, 57-8).

Almost every feature of Early Woodland pottery is present in the Neolithic ceramics of Northern Eurasia (Griffin, 1946, 45). Woodland cord-marked pottery is almost identical with Eurasiatic comb-ware, and Eastern Woodland check-stamped ware, which also occurs in northern Norway, seems related to textile ware (Gjessing, 1953). The primary difficulty in deriving Woodland pottery from Eurasian material has been the large gap in distribution from Manitoba and Saskatchewan (Fewkes, 1937) to the Bering Strait. Until the Cape Denbigh site was discovered, only late prehistoric Eskimo pottery was well known, but in the first ceramic level at this site (50 B. C. to 500 A. D.) was found check- and linear-stamped pottery which may represent a "relic" of west to east diffusion (Griffin, 1953).

It has been postulated that Early Woodland burial mounds, like the pottery, were of Asiatic origin, but this has not advanced beyond the stage of hypothesis.

Archaeological data suggesting Eurasiatic-American contact is supported by ethnological and folklore elements (Gjessing, 1953) such as bear cults, the shaman complex, hanging cradles, composite bows, tailored skin clothing, conical tents, folk-tale motifs, and so on.

Explanations regarding the mode of diffusion between Northern Eurasia and eastern North America await further investigation of western Canada and pre-Eskimo horizons in Alaska.

Eskimo

It is obvious that the Eskimos were of Asiatic origin, for the basic features of the earliest Eskimo cultures are more Eurasian than American (Collins, 1951, 435). There are parallels with both the Siberian Neolithic and the north European Mesolithic. Collins points out a number of similarities in geometric art between the European Mesolithic and Dorset-Old Bering Sea. On the other hand, Griffin (1946, 45) states that the presence in Old Bering Sea of plain and paddle-marked pottery, stemmed stone and slate projectile points, slate ulus, and end- and side-scrapers illustrates affinities with early Eastern Woodland cultures, and also that Dorset and Old Bering Sea flint and stone inventories are closer to those of Eastern Indians than to later Polar cultures. On the basis of these observations, we may assume that a great deal of the content of early Eskimo cultures is a "relic" of Eurasiatic-American diffusion through the coniferous forest belt.

It is interesting to note that the Indian tobacco-smoking trait did not reach the Eskimo area until pipes were introduced by Europeans into the Old World, diffused across the hemisphere, and were re-introduced into North America via the Bering Strait.

Northwest Coast

The origin of Northwest Coast cultures as a whole remains unexplained but Jenness (1941, 388) has extracted certain ethnological traits which point toward the Alaskan-Siberian region: whaling, stone lamps, slat armor, woven hats, curved fish knives, totem poles and grave monuments (similar to Amur River grave posts), music and art styles, mythology, and social status based upon wealth. To these one might add the extensive use of bone and antler, slate knives and points, antler sleeves, barbed bone points, heavy woodworking tools (adzes, chisels, gouges, grooved hammers), and bone wedges and gouges.

CHAPTER XVII

INDEPENDENT PARALLELS BETWEEN NORTH AMERICA AND EUROPE

Hunting and Gathering versus Agriculture

It is almost certain that agriculture was independently developed in the Americas, probably in the Andean region of South America. Eventually, agriculture spread into North America and ultimately was practiced as far north as the St. Lawrence River Valley. However, North America, like Europe, had a long period during which hunting, fishing, and gathering were the sole means of obtaining food, and as in Europe, hunting and gathering continued to be of considerable importance long after the introduction of agriculture. In certain regions, even within the temperate zone, agriculture never was adopted in the prehistoric period.

The introduction of agriculture in the East and Southwest brought no more immediate, overall change than it did in Danish Early Neolithic A. It is likely that certain groups in the Eastern United States began to use pottery before they adopted agriculture, which may have been the case in Ertebølle also.

The pre-agricultural "Archaic," i.e., Palaeolithic, stage was characterized by far more cultural homogeneity than the developed agricultural stages because of closer adaptation

to the environment, but once the diffusion of agriculture was well underway, the prehistoric Indians followed different lines of development, producing a wide variety of distinctive local culture complexes. The same thing took place in the European Neolithic, in which one of the primary features was a trend away from cultural homogeneity toward cultural diversity.

Shell Middens

In coastal and riverine areas, shellfish gathering permitted relatively permanent settlement in the pre-agricultural era and anticipated the more sedentary life of farming economies. The same circumstances existed on the coasts of Europe and are best illustrated by the Mesolithic-Neolithic transition in Denmark.

Domestic Animals

With the exception of dogs and possibly turkeys, no animals were domesticated in native North America, so no comparisons can be made with this economic aspect of the European Neolithic. The lack of domestic animals undoubtedly resulted in a greater emphasis upon hunting after the adoption of agriculture than was the case in Neolithic Europe.

Mining

Mining was an important industry in North America, but these activities have never been thoroughly studied by archaeologists.

W. H. Holmes made a number of surveys and investigations of native mining industries, and so far no one has carried it much further. The Indians extracted a wide array of minerals, including building stone; flint, chert, obsidian, and related materials; steatite; mica; catlinite (pipestone); turquoise; hematite and other pigment minerals; copper, silver, and gold; clay; and salt. Most mining was done by pitting or trenching, but there are a few old mines which exhibit tunneling. Near Leslie, Missouri, hematite ore beneath the surface of the ground was honeycombed with ancient tunnels and galleries, some large enough to accomodate standing workmen (Holmes, 1919, 266). In southern Illinois, native flint miners sank pits to a depth of 20 to 25 feet and then dug irregular tunnels at the bottom to extend the working surface without digging new shafts, and a mica mine in western North Carolina is said to have shown signs of the same type of tunneling (Ibid., 190; 245). In most cases, there is little indication of the miners' identity, although in the Historic period, it was observed that certain Indian tribes held "mining rights" to well-defined deposits of raw material.

There seems to have been no instance in which antler picks were associated with mines, but antler flint-chipping tools are commonly found in adjacent workshops.

Trade

In the Eastern United States, Lake Superior copper filled the same role as Baltic amber did in Europe. Copper trade began

in the Archaic and continued throughout the prehistoric period. In the opposite direction, marine shells from the Gulf of Mexico were imported into the north, paralleling European trade in Spondylus shells. Many other raw materials as well as finished products were important items for trade, and by Early and Middle Woodland times commerce reached a significant level in Indian economies. It is believed that the Hopewell people in particular ranged over vast areas of North America bartering their own products for exotic goods such as obsidian. At least indirect contact with the higher centers of culture in Meso-America is indicated by the inclusion of non-Woodland elements in the later prehistoric cultures of regions as far north as Wisconsin, and much of this diffusion must have arisen as the result of trade.

Ceramics

North American ceramics appear to have been derived from Forest Zone pottery in the Old World, but once adopted in the Western Hemisphere these ceramics underwent further elaboration, especially in the southern United States. Martin, Quimby, and Collier (1947, 50-60) attributed the following ceramic techniques to the North American Indians: construction by coiling, modeling (with the hands or with paddle and anvil), and molding in baskets and decoration by incising before or after firing, stamping and impressing, rouletting (rocked dentate stamping), punctating and embossing, plastic decoration (including zoomorphic and

anthropomorphic vessels), positive and negative painting, slipping, and glazing. Some of the simpler forms of decoration presumably were introduced with the Asiatic pottery, but the rest were American developments. However, some techniques, such as negative painting and glazing, clearly originated in Meso-America.

Neither the potter's wheel nor any other type of wheel was ever used in aboriginal cultures of the Western Hemisphere.

In addition to pottery, other articles like tobacco pipes, ornaments, and human figurines were made of fired clay.

Stone-work

Most European flint- and stone-working techniques were duplicated in North America, with the exception of microlithic industries. The Cape Denbigh Flint Complex really contained microlithic techniques rather than types. Burins are generally lacking, although they occur at Cape Denbigh and continue into Dorset according to Collins (1953a). Ground and polished stone implements appeared in the Late Archaic and were common thereafter. Some of the ceremonial implements in particular are fully as elaborate as European stone battleaxes. Axes sometimes were grooved or notched to facilitate hafting but apparently were not perforated, although hour-glass and tubular perforations occur in other stone artifacts.

An almost infinite variety of stemmed, notched, triangular, and leaf-shaped projectile points were manufactured, but one leading European type--the petit tranchet--is absent due to the lack of true microlithic industries. One flint type, the side-notched end-scraper (Fig. 23: m), is somewhat reminiscent of the transverse arrowhead and if hafted would have provided roughly the same sort of projectile point.

Before pottery even was introduced, containers commonly were made of soft stone like steatite. Many of these bowls were roughed out along a rock outcrop and then detached and polished; partly finished vessels often are found still attached to the living rock. Stone vases are found in the Near East, Malta, and Egypt, but not in Northern Europe--even the Greek and Balkan examples may represent imports (Childe, 1953, 202).

The so-called bannerstones, which now are thought to be atlatl weights rather than ceremonial objects, often bear a striking resemblance to European double-edged battleaxes. Holmes (1919, 23) thought these cylindrically-perforated implements were based on the double-axe of the Old World, but since such bannerstones occur in the Archaic, they probably represent a case of fortuitous morphological similarity.

Bone and Antler

Bone and antler were utilized much as they were in Europe, and undoubtedly the techniques for working these materials as

well as many of the implement forms can be attributed to Old World influences. One trait which probably developed independently in Europe and America was the use of human skeletal material for artifacts such as cranial-disc pendants.

Shell

Shell seems to have been used much more widely for implements, containers, and ornaments than it was in Europe. At least in certain regions this was due to the scarcity of suitable flint and stone.

Houses

Both circular and rectangular house foundations have been found on American sites. In some parts of North America very large rectangular houses were used as dwellings. On the basis of historic evidence it is known that tribes like the Haida on the Northwest Coast and the Iroquois in the Eastern United States used such structures as extended family dwellings (Murdock, 1934, 237; 297-8). This suggests that perhaps the Köln-Lindenthal "barns," and similar houses in Europe, may have served the same purpose.

Ceremonial Structures

The Woodland geometric earthworks reflect complex ceremonial activities in the same manner as the Henge monuments of Western

Europe. The most common type of Adena earthwork is a circular bank-and-ditch enclosure with at least one open gateway. The resemblance to European causewayed camps is obvious. These Adena enclosures must have been for ceremonial purposes; since there was no animal husbandry, they could not have functioned as "kraals." That the causewayed camps of Western Europe also may represent ceremonial structures cannot be dismissed too lightly, particularly in the light of the Henge monuments present in the same area.

Warfare

One can only guess at the importance of warfare during the pre-agricultural stage, but inter-tribal conflict probably increased radically after the introduction of agriculture, as it did in Europe. At the time of European colonization in the New World there were well-established patterns of warfare among the Indians, and the colonists soon learned to take advantage of traditional enmities to serve their own ends. The number of weapons and the increasing occurrence of palisaded villages and hilltop forts (and Southwest cliff-dwellings) seen in the archaeological record show that this sort of conflict was of some antiquity.

It is believed that Indian warfare was largely a matter of prestige and revenge, but presumably there were underlying economic factors playing a part as well. Certainly the measures taken to fortify settlements suggest this.

Types of Burial

Forms of burial in North America were even more varied than in Europe. In addition to flexed, extended, and cremated remains, we find a number of types of secondary burials, such as bundle burials, in which disarticulated remains were interred in a fabric or skin bag. The burial of detached crania recalls similar occurrences in Europe, e.g., Ofnet and Belgian Michelsberg. As in Europe, both single and multiple burials are found. Red ochre was used as widely in America as in the Old World.

Intentional interment of animals, especially dogs, was common practice in a number of areas. As in Europe, such burials occurred separately or in conjunction with human remains.

In the late prehistoric and early Historic periods, ceremonies were held at intervals by certain tribes to honor the dead. At the ceremonies those who had died since the previous ritual were defleshed and exhibited on wooden scaffolds before being permanently buried. Accounts of such rituals were given by early European explorers.

During the Archaic, as in the European Mesolithic, burials usually were placed casually in middens, refuse heaps, or old storage pits, but after the increase in cultural sophistication brought about by the formation of agricultural economies, burial ritual became more and more complex. Burials were deposited in houses, mounds (including glacial kames), cemeteries, stone cairns, log coffins and tombs, stone vaults approximating

passage and gallery graves, stone cists for single burials, urns, and specially-built grave houses. Besides utilitarian grave goods, ceremonial objects were buried with the dead.

Ritual Deposits

Paralleling the ritual deposits of Danish Funnel Beaker culture are Hopewell ceremonial offerings placed upon wooden platforms.

Social Stratification

Following the introduction of agriculture, social groups not only were more permanently settled but larger, and within these societies we can detect social stratification. Historical evidence shows that such stratification existed when Europeans arrived, but archaeology likewise is able to reconstruct the existence of different roles within Indian cultures.

The construction of the large mounds and earthworks reflects effective political control as do the burial and ceremonial monuments in Europe. The Ohio earthworks and Mississippi temple mounds also suggest the presence of an organized priesthood, which may or may not have wielded the political control of the group as well.

Although most males did (or could) take part in war, there were war leaders or chieftains who attained the position either through inheritance or prowess as warriors.

A glance at the wide variety of raw materials and finished products used by Hopewell and Mississippi Indians is enough to convince one that there must have been craft specialists.

PART IV

RELATIONSHIPS OF MESOLITHIC AND NEOLITHIC ECONOMIES

CHAPTER XVIII

MESOLITHIC AND NEOLITHIC CONTRIBUTIONS

Before beginning a discussion of Mesolithic influences in specific Neolithic cultures it must be determined which traits are to be considered as Mesolithic and which as Neolithic in origin. In certain instances the conclusions are based on clear-cut archaeological evidence, but in other cases the answers can be reached only by inference.

Economy

Implicit in the definition of "Neolithic" is the introduction of agriculture to supplant the Old Stone Age hunting, fishing, and gathering economies. As we have seen, the two systems were not mutually exclusive. Many Neolithic societies either retained hunting and gathering techniques from their own Mesolithic background or adopted them from Mesolithic tribes with whom they came into contact. The resultant Neolithic economies ranged from wholly agricultural (Early Danubian) to virtually non-agricultural (Pit-Ware).

Although there is evidence of trade in such items as Baltic amber and Mediterranean shells during the Mesolithic, commerce was of far greater volume and regularity in the succeeding era. It is almost certain that Neolithic trade was more

formalized, with individuals or groups of individuals devoting themselves entirely to such activities.

The origin of Western European flint-mining remains in doubt. Whether or not the mining industries had a Mesolithic heritage, it is clear that this work assumed great importance during the Neolithic. Furthermore, the mines may have been exploited by communities of mining specialists, as at Spiennes, during the Neolithic period, which would not have been the case at the pre-Neolithic level.

Because of these differences in economic emphasis, Neolithic cultures became more and more diverse as time progressed. The appearance of Neolithic Europe is one of cultural heterogeneity in comparison with the relatively homogenous Mesolithic period. The same phenomenon is apparent in North America after the introduction of agriculture.

Dwellings

Throughout the Mesolithic period small, irregular huts or windbreaks were used for temporary or seasonal habitation, while most Neolithic structures were more complex and permanent. The dominant house type was a one- or two-room rectangular structure, which might attain considerable size, as at Köln-Lindenthal. Increased warfare led to the erection of fortifications and the selection of defensible sites. In Western Europe, the causewayed camps, or kraals, reflect the importance of animal

herding. Ceremonial structures, such as the Henge monuments (and possibly the causewayed camps), illustrate large-scale communal participation in the construction of non-utilitarian "public works." These monuments, like the elaborate tombs, offer striking proof of the increasing complexity of social organization during the Neolithic.

Burial Patterns

With the exception of the Téviec tombs, burial during the Mesolithic was carried out in a casual manner. Most bodies were placed in middens or refuse pits with or without grave goods. Extended burial was predominant, although flexed burials also occurred. Cannibalism has been attested in some cases, notably at Dyrholmen.

Neolithic burial ritual varies from refuse-pit interment to the use of stone-built tombs containing one or many corpses and cemeteries of individual graves. Cremations as well as flexed and extended burials are attributed to the Neolithic. One peculiarity of the Central European Neolithic is the occurrence of animal burials, either as separate interments or as accompanying features in human graves.

Technology

The beginning of the Neolithic period is marked also by the appearance of ceramics. There is no indisputable evidence for the manufacture of pottery during the Mesolithic. We are

justified in assuming that containers of wood, bark, skin, or basketry were used, since they are common enough elements in pre-ceramic cultures elsewhere.

The techniques of cutting, grinding, and polishing bone and antler were well known in the Mesolithic, but these techniques were not often used in the production of stone implements. There are relatively few examples of polished stone tools in the period preceding Neolithic influence; most tools were merely flaked or chipped. Most Neolithic axes, on the other hand, are polished, except in cases where there was a "Campignian" element connected with flint-mining. In contrast to Mesolithic axes, many Neolithic axes have cylindrical perforations. Any perforated implements of the Mesolithic period have double-conical rather than tubular shaftholes. Blade and microlithic industries were of Upper Palaeolithic-Mesolithic origin, and associated with these are petit tranchets and derivative arrowheads, based upon the Tardenoisian trapeze.

Among the stone types which are typical of the Mesolithic are axes, adzes, and chisels (unpolished and unperforated) made on flakes or cores; transverse axes; transverse arrowheads; maceheads with hour-glass perforation; hollow-edged chisels (gouges); microliths and blades for insertion in composite implements; and a variety of tools made on blades. The use of ground slate, as Gjessing suggests, probably represents the transfer of Mesolithic bone-working techniques to that material

in regions where suitable flint was lacking. Non-Mesolithic types in the Neolithic include polished axes, adzes, and chisels (perforated or unperforated), maceheads with cylindrical perforations, triangular, tanged, and leaf-shaped arrowheads, polygonal battleaxes, and spinning whorls. The status of single-piece sickles is not clear. They may have been derived from curved flint and slate knives which appear in the Circumpolar Stone Age and which in turn could be based on boar's tusk knives of the Mesolithic.

Most bone and antler types and the techniques by which they were made are of Mesolithic ancestry. A number of Mesolithic bone and antler types continued in use during the Neolithic, and included among these are antler axes and picks and antler sleeves; barbed bone or antler points, plain and conical bone points; socketed bone spearheads; points grooved for flint inserts ("bird darts"); bone awls, needles, spatulas, scrapers, wedges, double-pointed gorges, fishhooks, and daggers; bone or antler gouges (upon which the stone gouges were based); bone and antler ornaments; worked boar's tusk (knives, scrapers, or pendants); and perforated animal teeth. Geometric or pit-decorated designs on bone implements or ornaments also can be traced back to the Mesolithic.

An affection for amber ornaments and amulets was initiated in the Mesolithic, but since this interest persisted into the historic period the use of amber does not seem to warrant a distinctively Mesolithic label.

CHAPTER XIX

MESOLITHIC CONTRIBUTIONS TO THE NEOLITHIC

The introduction of agriculture was the first step in breaking down the Mesolithic way of life, which took centuries to complete. The tenacity of Mesolithic tradition was greatest in marginal areas and seems to have been increasingly strong as Neolithic populations progressed northward. Especially in the far north Mesolithic traditions persisted throughout the Neolithic period, and the final result was the creation and diffusion of the Circumpolar Stone Age.

In the southern part of the Continent, the force of the Neolithic diffusion must have been sufficiently powerful to submerge the Mesolithic population. It is hardly reasonable to assume that there was no well-developed Mesolithic tradition in the south. That such a tradition did exist is shown by the cultural remains at sites like Lengyel. On the other hand, it is more than probable that the Neolithic colonization lost some of its intensity as it spread into marginal and less desirable areas. Because the vigor of the Neolithic revolution was reduced, hunting and gathering cultures were much longer in dying out.

This differential acculturation was a fundamental source of the cultural diversity characterizing the European Neolithic.

Nor was this limited to Europe, for the same process can be followed across Asia and the Western Hemisphere.

For some time it has been clear that virtually all Neolithic cultures contain Mesolithic traits. Only the first Danubian farmers (Danubian I) used no Mesolithic equipment, and this very fact has been used as proof that agriculture was not an indigenous development in temperate Europe. In spite of this, few attempts have been made to summarize and explain this New Stone Age extension of the Mesolithic. Stuart Piggott (1954b) has made considerable progress in this direction with British material, and J. G. D. Clark (1952) has discussed the retention of Mesolithic traits from the point of view of economy and technology rather than through the medium of specific cultures. A noteworthy attempt to summarize Mesolithic influences on Neolithic cultures of the Continent has been made by Mazalek,[1] although his material is rather limited in scope.

Mazalek cites three types of evidence for the co-existence of Mesolithic and Neolithic economies: (1) the existence of "pure" Mesolithic sites, (2) the occurrence of mixed sites, and (3) non-archaeological dating proving the contemporaneity of (1) and (2).

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1. "Zur Frage der Beziehungen zwischen Mesolithikum und Neolithikum," Anthropozoikum III (1953): 203-34.

Mazalek's criteria of relationship are the blade and microlithic flint industries typical of Azilian, Tardenoisian, and Swiderian, which at least in their later stages are co-existent, or directly associated, with Neolithic economies in Western, Central, and Eastern Europe. The Northern Forest cultures are disregarded because of their uncertain correlations with other Mesolithic cultures. His conclusion is that all post-Danubian I cultures exhibit Mesolithic blade or microlithic flint types. In most of Europe, these influences are associated with the later Tardenoisian levels, but in France even Tardenoisian I shows contact with the Neolithic. This may have been what led Baron de Loë (1928, 103) to classify Tardenoisian as the initial Neolithic culture of Belgium. Figure 24 on the following page presents a tabulation of Mazalek's findings in somewhat compressed form.

Although other blade and microlithic tools occur in variable quantities, the petit tranchet is almost invariably present, either as the trapezoidal form or a derivative. The microlithic type most infrequently encountered is the microburin, which occurs occasionally in Western Europe but never in Eastern Europe.

In addition to Mazalek's distribution of transverse arrowheads, we find them in Early and Middle Neolithic contexts in Scandinavia, in British Secondary Neolithic cultures, and in the Spanish Neolithic (Fig. 25). The one place where transverse points are extremely rare is Switzerland, for both Cortaillod and Horgen concentrated on other types of arrowheads. In all

Fig. 24

Microlithic flint types of the Neolithic.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
	X	X		X	X	X			X	X			X	
				X				X						
	X	X		X	X	X		X	X	X	X		X	
	X				X		X	X			X			
	X	X		X	X			X	X	X			X	X
	X	X	X	X	X	X		X	X	X		X	X	
	X			X			X							
	X			X	X	X			X	X			X	X
													X	
	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	X	X			X				X			X		
	X	X		X	X			X	X	X				
													X	

A. Jungere Bandkeramik
B. Omalian
C. Theiss
D. Stichbandkeramik-Rössen
E. Moravian Painted Ware
F. Münchshöfen
G. Jordansmühl
H. Megalithic
I. Comb-Ware
J. Funnel Beaker
K. Globular Amphorae
L. Michelsberg
M. Cord-Ware
N. Bell Beaker

parts of temperate Europe we find late Tardenoisian and even Azilian counterparts of the chisel-ended projectile points used in Neolithic cultures. In Scandinavia, transverse arrowheads appeared in Maglemose (Fig. 7: b) and the rhombic form (Fig. 7: c) became typical of Ertebølle. Although Tardenoisian II - III contains virtually every microlithic form suited for use as transverse points, Azilian offers primarily triangular and crescentic types. Other blade or microlithic implements, while not so widely distributed, are present in quantities large enough to indicate the tradition as a whole was passed on, rather than just this single form.

It is somewhat unfortunate that Mazalek chose to ignore both the axe cultures and the non-lithic elements of the Mesolithic which are equally informative. As a result, Mesolithic influences during the succeeding period are treated primarily as technological relics, while the continuation of economic patterns associated with hunting and fishing escapes attention. Besides a

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Fig. 25. Mesolithic and Neolithic transverse arrowheads.

a. Azilian
b. Tardenoisian
c. Omalian
d. Spanish Almerian
e. Scandinavian Passage Grave
f. British Secondary Neolithic
g. Globular Amphorae
h. Moravian Painted Ware
i. Cord-Ware

(After Peters, 1941; Mazalek, 1954; Hamal-Nandrin, 1936; Childe, 1950; Glob, 1952; Piggott, 1954b; Sprockhoff, 1938.)

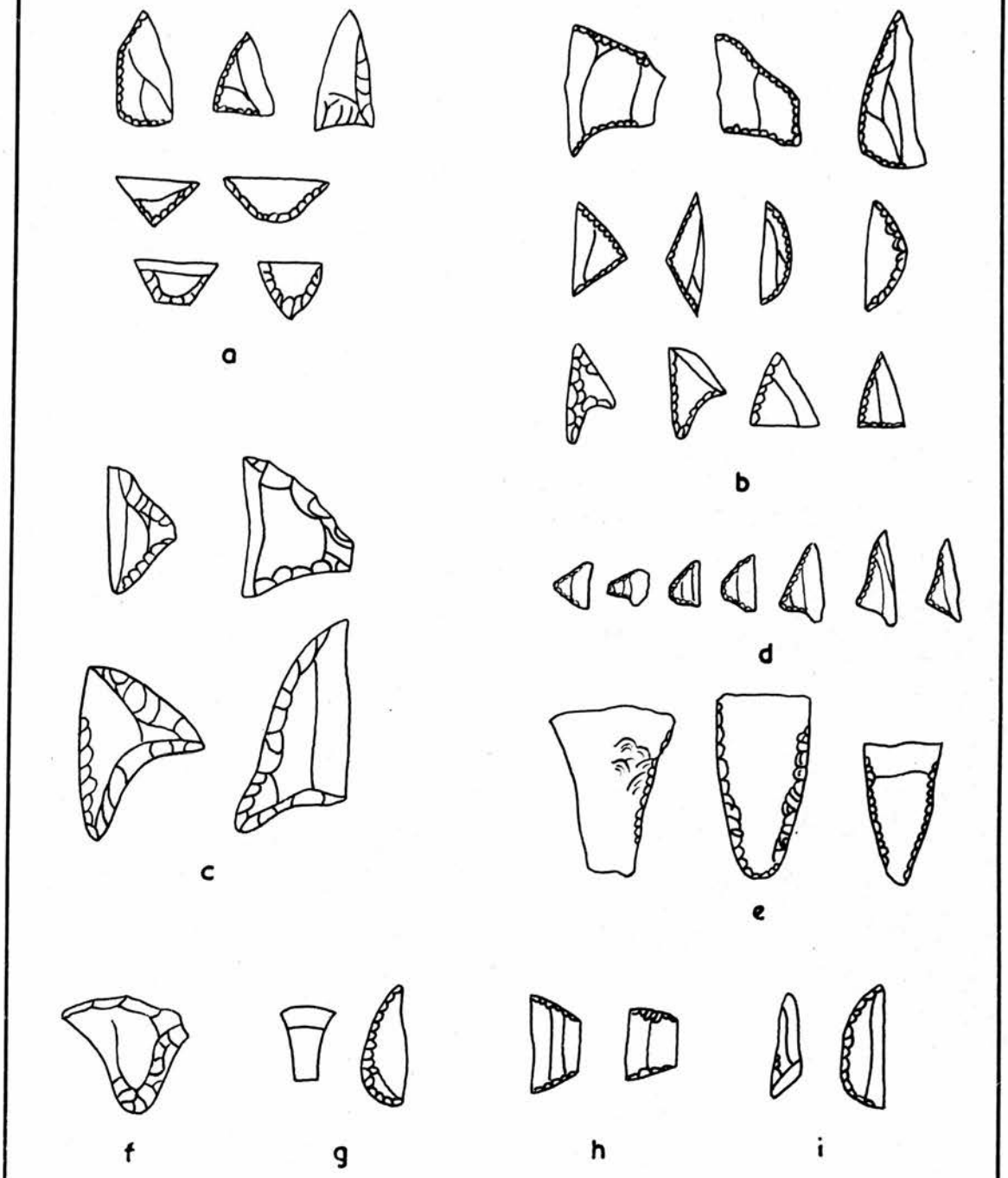

Fig. 25

consideration of ecological limitations or potentialities, we may profit from an examination of the evidence offered by faunal remains and non-lithic cultural material, however scanty they may be.

In any study of this type, it is imperative that we bring in the Baltic Mesolithic to bolster the poorly-documented Azilian and Tardenoisian industries. Although axes and other heavy implements seem to have been somewhat limited in distribution, surely many of the implements used by Maglemose and Ertebølle hunters were not solely Baltic forms, as has been suggested already in Chapter VI. Moreover, the discovery of antler harpoons, bone fishhooks, antler axes, or other similar tools in Neolithic contexts proves these were used in Mesolithic cultures of Central, as well as Northern, Europe.

Faunal remains offer an effective gauge of economic pursuits, although information on this subject is woefully inadequate. However, in a number of instances our knowledge is supplemented by descriptions of bone material recovered.

If much of the late Mesolithic was contemporary with the Neolithic, we might expect to find domestic animals as well as pottery or polished stone tools occasionally associated with Mesolithic industries. Either due to the lack of preservation or inadequate descriptions, this is seldom the fact. Degerbøl feels many of the ox bones on Ertebølle middens may belong to domestic animals. Peters (1941, 6) lists wild swine and cattle

among the fauna of the Upper Danubian Azilian, and in this and other similar situations one wonders whether the distinctions between the wild and domestic forms of these two animals are always correctly ascertained. Remains of sheep or goat and cattle were reported from the Tardenoisian II - III levels of Cuzoul de Gramat (Lacam, Niederlender, and Vallois, 1944), and a single molar of sheep or goat was found at Téviec (Péquart, Boule, and Vallois, 1937). In the case of Téviec, this suggests the settlement was not early Mesolithic, which is in accordance with the coastal economy and the use of transverse arrowheads.

With regard to either Mesolithic or Neolithic sites, the proportions of individual species is indicative of the importance of each in the economy. Clark (1936; 1952) has shown how forest and coastal facies of the Baltic Mesolithic vary in this respect. At a later date, the suggestions of seal-hunting in Ertebølle are multiplied as this became an important industry, not only in Scandinavia but as far south as sites like Er Yoh in France. In this respect, Clark has expressed the opinion that increased emphasis upon sea-mammal hunting arose through the stimulus for trade provided by the appearance of Neolithic farmers.

Not only did Mesolithic man contribute to Neolithic technology because of his familiarity with the resources of the sea, but because of prior adaptation to life in the forests was able to aid Neolithic farmers in coping with this very important aspect of the environment. We know that Neolithic colonists did not

avoid the forested areas of Europe and living in them drew heavily on Mesolithic lore (Clark, 1945, 66). This certainly would account for the adoption or continuation of hunting and gathering practices during the Neolithic, and in the case of more conservative groups who preferred to follow the older established patterns would explain the apparent anomaly observed in occasional increases of hunting and gathering during the later Neolithic. Even in predominantly agricultural economies we almost invariably find some evidence of hunting or fishing, even though this may have been primarily for sport or destruction of vermin.

This brings us to another way in which faunal remains may be very enlightening. Particularly in Switzerland and Denmark there is a certain amount of statistical information regarding the proportions of wild and domestic animals, providing a basis upon which to judge the relative importance of stock-raising and hunting. It is obvious that Switzerland is characterized by far greater emphasis upon hunting in the early Neolithic than was the case in Britain, France, Germany, or Denmark. However, if Troels-Smith has interpreted Ertebølle correctly, we will be forced to credit the early Neolithic period in that country with much more hunting and fishing than we have in the past.

In Switzerland, another peculiarity arises when we compare the percentage of wild animals in the Early and Middle Neolithic periods, for here we see the best faunal evidence for an increase in hunting in a later period of the Neolithic. Significantly

or not, this increase is associated with a Secondary Neolithic culture which reveals other hints of cultural conservatism or retarded acculturation.

Much as we would like it to be otherwise, there is seldom sufficient faunal evidence to indicate the importance of hunting and fishing. However, we are not altogether restricted, since the cultural material recovered from the settlements throws some light upon the situation. It is not irrational to suppose that if we find implement types related to Mesolithic forms, Mesolithic economic pursuits are involved as well. In any case, the fact that these older artifact types are duplicated in the Neolithic shows we are dealing with a continuum. In addition to the presence of transverse arrowheads, even better evidence of hunting and fishing is offered by bone fishhooks, gorges, and barbed points, which hardly can be interpreted other than as hunting or fishing equipment.

Needless to say, if these or other implements are made of wild-animal bone, hunting is almost necessarily implied. The use of antler is not quite so clearly correlated with hunting, for in Britain most of the antler proves to have been shed. If boar's tusk was widely utilized or perforated teeth worn as ornaments, the implication again is that hunting was part of the economy, and we can gain some insight into the types of animals hunted. The use of antler "axes" or "adzes" also may reflect hunting if we interpret them as tools for cleaning game.

Another facet of Mesolithic influence was in forest-clearing and wood-working, and evidence of this is present in the form of antler sleeves for hafting axes and gouges of bone and antler, or stone gouges ground and polished in imitation of the latter. Some of the antler axes may have served as wedges for carpenters, and stone axes themselves were invented by Mesolithic woodsmen. The appearance of the socketed, Ertebølle-type antler axe in Central Europe, especially in the Eastern Danubian cultures, strengthens the assumption that there was a certain amount of uniformity in the underlying Mesolithic cultures in different areas.

A number of other bone and antler tools were utilized in the Mesolithic and outlived the period because of their usefulness and ease of manufacture: awls, needles, daggers, scrapers, wedges, picks, ornaments, and so forth.

In the realm of art, one may point to simple geometric ornamentation and pit-decoration, of which pit-ornament is perhaps most significant because of its more limited distribution. Such decoration of utilitarian and ornamental objects was typical of Maglemose and appears in Tardenoisian (Fig. 26: b) and in some Neolithic cultures (Fig. 26: a, c-g). It occurs most frequently in Northern or Central European Funnel Beaker cultures, although the technique apparently was employed in Belgium (Fig. 26: a) and Switzerland (Gonzenbach, 1949, Tab. 12: 11) and appeared at Jordansmühl according to Seger (1906). In passing,

one might wonder if this Mesolithic trait inspired pit-decoration of pottery in the northern Sub-Neolithic cultures.

Fig. 26. Neolithic pit-decorated objects.

a. Belgian Neolithic (SOM?)
b. Belgian Tardenoisian
c. Danish Early Neolithic
d. Danish Passage Grave
e. Danish Single Grave
f. North German Passage Grave
g. Central German Passage Grave

(After Loß, 1938; Glob, 1952; Sprockhoff, 1938.)

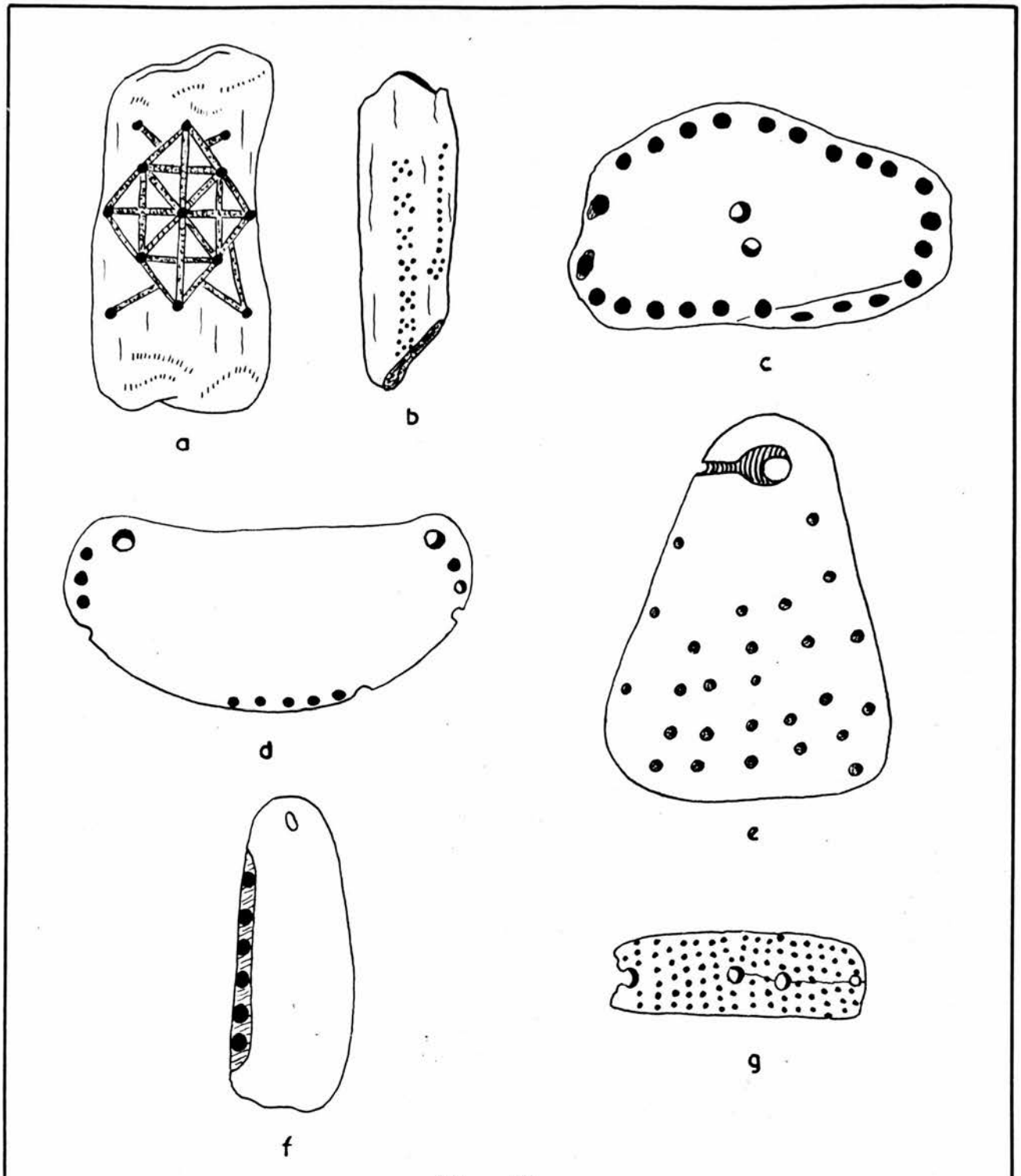

Fig. 26

CHAPTER XX

PRIMARY AND SECONDARY NEOLITHIC CULTURES

The earliest Neolithic settlers of Early Danubian had no Mesolithic traits of importance, at least so far as excavation has shown. There must have been nothing but the most casual relations with indigenous hunters and gatherers initially, largely because of the sparse population. Certainly the rarity of weapons and absence of fortifications well illustrate the lack of any sort of competition for land. However, as the colonization of Europe expanded, increased contact between hunters and farmers and between different Neolithic groups brought about significant changes and diversification in culture patterns. One of the most important changes is that we have been considering, the incorporation of Mesolithic cultural elements into the agricultural complexes. Aside from the fact that acculturated populations tend to retain some of their old ways, it has been admitted that the Mesolithic inhabitants of temperate Europe were able to offer means of adapting to the forests in which the farmers found themselves.

The Stroke-ornamented Ware cultures probably developed as the result of the influence of Danubian colonists upon local Mesolithic economies. Danubian tools and pottery still provided the bulk of material equipment, but there were some alterations

and additions. While ceramic forms also remained essentially Danubian, decorative techniques were modified considerably. Linear patterns of short furrowed strokes replaced the incised meander designs typical of Early Danubian, and some Rössen ware was made in imitation of basketry. A number of Mesolithic artifact types, suggestions of an increased importance of hunting, and certain burial features betray a Mesolithic undercurrent.

In the Eastern Danubian cultures, there was again a preponderance of Danubian traits, although both Mesolithic and new Neolithic elements may be detected. These people used blade and microlithic tools as well as a wide range of bone and antler implements and ornaments, and we may infer that hunting was more popular than in Early Danubian. Mesolithic elements were being absorbed by a Neolithic economy which by and large managed to maintain its Danubian character. More important were new ceramic and metallurgical elements filtering in from the Mediterranean, promoting cultural divergences and far outweighing Mesolithic influences.

The question of whether the Funnel Beaker cultures arose through acculturation of Northern Forest tribes by immigrant Danubians must be left unsettled, but Mesolithic traits seem to have been relatively few in number. In the case of the Scandinavian groups, we have direct evidence that hunting provided an insignificant proportion of the food supply, for wild fauna are scarcely represented in comparison with the

large number of domestic animals. This of course does not include other cultural assemblages of Scandinavia, such as Ertebølle and Pit-Ware, which in contrast were more Mesolithic than Neolithic in their patterns of life.

Western Neolithic cultures of France and Britain were alike in their emphasis upon cattle-herding and disregard for hunting and gathering. Even Mesolithic artifact types are rarely associated with them, and few traits of any type may be traced back with certainty to the preceding period. Cortaillod, the Swiss version of the Western Neolithic, presents a different picture, however. Not only do we find many Mesolithic-type artifacts but an astounding dependence upon hunting and fishing. Analysis of the faunal debris on Cortaillod sites has revealed that at least 30%, and sometimes more, of the animals represented belong to wild species, and it may be determined further that most of these animals were killed for food. Lake-side settlement in combination with equipment for fishing is sufficient proof for the importance of that industry. Large as the percentage of wild fauna is on Cortaillod sites, it increases still further in the following Horgen levels.

Figure 27 gives a sample cross-section of Mesolithic traits ascribed to various Primary Neolithic cultures.

Secondary Neolithic cultures are those which are characterized by a number of traits whose origins lie in the Mesolithic or can be explained as the result of Mesolithic groups changing to a

Fig. 27. Mesolithic traits in Primary Neolithic cultures.

	A	B	C	D	E	F	G	H	I
Blade or microlithic tools	X	X	X	X	X	X		X	X
Transverse arrowheads	X	X	X			X		X	X
Core or flake axes						X	X	X	
Stone gouges									X
Antler axes or picks	X	X	X	X	X		X	X	X
Antler sleeves		X			X	X			X
Barbed points					X	X			
Fishhooks or gorges					X	X			
Bone chisels or scrapers	X	X			X		X	X	
Bone awls or needles	X	X	X	X	X	X	X	X	
Bone or antler ornaments	X	X	X	X	X	X	X	X	
Bone daggers	X		X		X			X	
Pit-decoration			X		X			X	
Perforated teeth	X	X	X	X		X		X	
Worked boar's tusk	X	X	X	X	X				

A. Stichbandkeramik-Rössen
B. Moravian Painted Ware-Lengyel
C. Jordansmühl
D. Brzesc Kujawski
E. Cortaillod
F. Chassey
G. Windmill Hill
H. Northern Funnel Beaker
I. Eastern Funnel Beaker

Neolithic economy. The appearance then is one of reversion to a Mesolithic way of life, rather than progression to an agricultural economy which is really the case. As we would expect, these cultures have certain affiliations with Danubian, Western Neolithic, or Funnel Beaker cultures responsible for their acculturation. Also, as Professor Piggott has indicated, the Secondary Neolithic cultures are in certain respects a part of the Circumpolar Stone Age continuum, whose components may be termed Sub-Neolithic.

Figure 28 enumerates individual traits which seem to be of some analytic value and shows their occurrence in Secondary Neolithic cultures and some related groups. The diagnostic features fall under (1) economy, (2) burial practices, (3) stone types, (4) bone and antler work, (5) ceramics, and (6) relative date.

In all the cultures defined as Secondary Neolithic, there are at least suggestions that hunting and fishing were of greater economic significance than in the Primary Neolithic cultures. In the case of Horgen, statistics on the fauna show an increase in hunting, which is all the more marked in view of the relative importance of this in Cortaillod. With regard to other Secondary Neolithic economies this type of evidence has not been obtained, and at best we have only general statements about the proportions of wild animals. Wild animals are said to be abundant on Michelsberg sites, and at Skara

Fig. 28. Secondary Neolithic traits of diagnostic value.

	A	B	C	D	E	F	G	H	I	J
1. Hunting and fishing	X	X	X	X	X	X	X	?	?	X
2. Extended burial	X	X		X	X			X		
3. Blade/microlithic industry	X	X	X	X	X	X	X	X	X	X
transverse arrow-heads	X	X	X	X	X	X		X		X
"Campignian" complex	X	X	X	X	X	X				X
Stone gouges	X	X	X							
Single-piece sickles		X	X	?					X	
4. Antler axes, adzes, picks	X	X	X	X	X	X	X		X	X
Antler sleeves	X	X		X	X	X	X		X	
Bone or antler barbed points	X	X	X		X	X				
Bone awls or needles	X	X	X	X	X	X	X	X	X	
spatulas, scrapers	X	X	X	X	X	X	X		X	X
double-pointed gorges	X	X	X	X	X					
fishhooks	X	X		X	X			X		
daggers	X	X		X				X		
Bone or antler gouges	X	X	X							
Geom. and pit-dec. designs	X	X	X	X				X		
Bone or antler ornaments	X	X	X	X	X	X		X		
Perforated animal teeth	X	X	X	X	X	X		X		
Worked boar's tusk	X	X	X	X	X					
5. Deteriorated ceramics	X	X	X	X	X	X	X	X	X	
6. Chronologically late		X	X	X	X	X	X	X	X	X

A. Ertebølle
B. Circumpolar Stone Age
C. British Sec. Neolithic
D. Fort-Harrouard
E. Michelsberg
F. SOM
G. Horgen
H. Walternienburg
I. Altheim
J. Omalian

Brae in the Orkneys (Rinyo-Clacton) there are indications of considerable hunting, fishing, and fowling. Since Seine-Oise-Marne material is predominantly from graves, we know relatively little about any aspects of the economy. At Fort-Harrouard agricultural activities seem to have been more important than hunting and fishing, although fishing appears to have been of greater significance than the reports indicate. Moreover, one suspects that other sites might reveal even more evidence of these pursuits.

In the absence of faunal descriptions, we are forced to rely on the use of implements suitable for hunting and fishing in order to assess their importance, and for this reason our estimation is intimately related to the presence of revealing stone, bone, and antler types. In this respect, we may refer to the presence of transverse arrowheads, barbed points of bone or antler, and bone fishhooks or gorges. In addition, the wide use of bone and antler, boar's tusk, or perforated teeth may in many instances reflect the scope of hunting practices. All the Secondary Neolithic groups contain a wide range of these traits, whereby we may assume hunting and fishing were emphasized in spite of the fact that we do not always have direct evidence. Horgen, which lacks both transverse arrowheads and barbed points, provides us with plenty of faunal evidence that Mesolithic economic pursuits were not only present but reinforced.

Another aspect of Secondary Neolithic economy, probably initiated by Western Neolithic people, was flint-mining with its associated "Campignian" traits. Only Horgen failed to become involved in this pastime, and this may be credited to its geographical location outside the primary Western European area of flint exploitation. The possibility exists that flint-mining was a carry-over from the Mesolithic, but this is difficult to prove.

The least important and informative feature is burial ritual, since individual Secondary Neolithic groups usually followed local Neolithic practices, including the use of megalithic tombs. Extended burial is predominant only at Fort-Harrouard, although it occasionally occurs elsewhere, and the burial habits of Michelsberg and Horgen are virtually unknown.

All Secondary Neolithic cultures possessed blade tools, and all but Horgen used transverse arrowheads. Blade and microlithic industries, as we have illustrated, clearly represent an extension of Mesolithic technology into the Neolithic period. Less widespread flint and stone forms are single-piece sickles (British Secondary Neolithic and perhaps Fort-Harrouard) and stone gouges (British Secondary Neolithic) based on Mesolithic bone and antler gouges. Both of these appear in the Circumpolar Stone Age and provide a link with the Northern Sub-Neolithic. The single-piece sickles may be genetically related to curved slate knives and boar's tusk knives of that region.

Most of the bone and antler tools can be duplicated in Mesolithic cultures and therefore may be traced back directly to that period. Generally speaking, it is of these implements that we know least, since they normally disintegrate rapidly. The use of pit-decoration on bone, antler, and amber may have been more common than the chart illustrates.

Most of the traits discussed so far are to be found in other Neolithic cultures, although with lower frequencies. In combination with these, two further features seem to set off the Secondary Neolithic as a distinct if heterogeneous cultural unit. Characteristic is a deteriorated ceramic tradition with simple pottery, poorly-made and sparsely decorated. While the pottery of the individual cultures is not necessarily related, even in the case of Seine-Oise-Marne and Horgen, all of it appears degenerate. Possibly, as Piggott has suggested, this reflects increased use of organic containers or, we might add, unfamiliarity with the more refined ceramic techniques. Figure 29 illustrates some of the ceramic forms typical of Secondary Neolithic cultures and related types from other Neolithic cultures. Of particular

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Fig. 29. Secondary Neolithic ceramic types.

a, b. SOM - Horgen
c. Rinyo-Clacton
d. Ronaldsway
e, f. Michelsberg
g, i. Polish Funnel Beaker
h. Altheim
j, k. Scandinavian Late Neolithic

(After Childe, 1950; Piggott, 1954b; Jazdzewski, 1936; Buttler, 1938; Reinecke, 1924.)

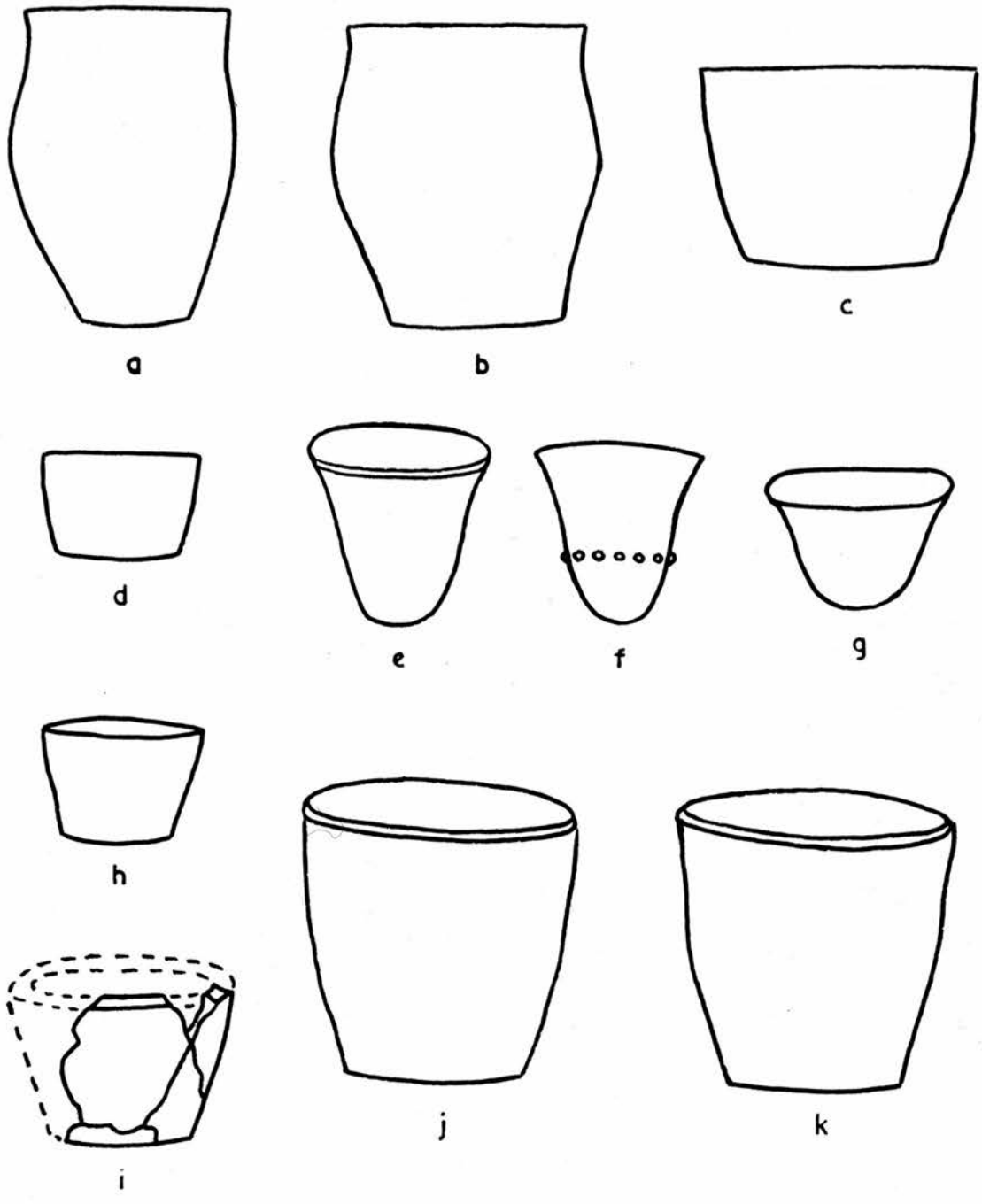

Fig. 29

interest is the occurrence in early Polish Funnel Beaker culture of pot types comparable with both the round-bottomed beakers of Michelsberg (Fig. 29: g) and the flat-based, straight-sided vessels of the other Secondary Neolithic cultures (Fig. 29: i).

Each of the Secondary Neolithic cultures begins relatively late in the Neolithic which, when compared with preceding Neolithic cultures, makes it appear degenerate. Therefore, a chronologically late date may be used as a final criterion for recognizing a Secondary Neolithic culture.

Further information concerning Neolithic cultures on the Continent may result in the recognition of other Secondary Neolithic groups. Belgian Omalian, for example, obviously contains a number of Mesolithic traits, especially in its flint-work (Fig. 18: f and Fig. 25: c). Certain "Campignian" flint types suggest a connection with Belgian flint-mining, and a number of other features indicate affinities with the Secondary Neolithic and Circumpolar Stone Age.

Altheim, another Danubian sub-group, is suspiciously like Horgen with regard to its date and location, house types, pottery (Fig. 29: h), blade industry, and bone-work. The use of single-piece sickles provides a relationship with the British Secondary Neolithic.

Walternienburg-Bernburg is characterized by a number of Mesolithic-derived traits, but whether these speak for a continuation of elements present in Baalberg-Salzmünde or a re-emergence of Mesolithic tradition is not clear. It is not

entirely certain that Walternienburg-Bernburg was merely a further development of the Baalberg-Salzmünde sequence, and it seems to include a greater proportion of Mesolithic elements.

In conclusion, it has been possible to extend Professor Piggott's concept of the Secondary Neolithic to the Continent, where the processes of acculturation leading to the formation of such cultures may be detected in northern France, Germany, and Switzerland. With certainty, we are able to add Seine-Oise-Marne, Fort-Harrouard, Michelsberg, and Horgen to the roll of Secondary Neolithic cultures in Europe. It is likely that other additions, such as Omalian, Altheim, and Walternienburg-Bernburg, will be confirmed in the future.

L I T E R A T U R E C I T E D

Abbreviations

Aarbøger	Aarbøger for Nordisk Oldkyndighed og Historie
Acta Arch.	Acta Archaeologica
AfA	Archiv für Anthropologie
Altschlesien	Altschlesien
Am. Ant.	American Antiquity
Antiquity	Antiquity
Ant. J.	Antiquaries Journal
Arch.	Archaeologia
Arch. Inst. Pal. Hum.	Archives de l'Institute de Paléontologie Humaine
Arch. J.	Archaeological Journal
Arch. Res. Pub. (N. I.)	Archaeological Research Publications (Northern Ireland)
Arch. Rozh.	Archeologické Rozhledy
ASA	Anzeiger für Schweizerische Altertumskunde
ASAG	Archives Suisses d'Anthropologie Générale
BAE	Bureau of American Ethnology
Bayer. Vorg.	Der Bayerische Vorgeschictsfreund
BRGK	Bericht der Römisch-Germanischen Kommission

BSPF	Bulletin de la Société Préhistorique Francaise
BSRB	Bulletin de la Société Royale Belge d'Anthropologie et Préhistoire
CIAAP	Congrès International d'Anthropologie et d'Archéologie Préhistoriques
CISPP	Congres International des Sciences Préhistoriques et Protohistoriques
Eastern U.S.	Archaeology of Eastern United States (J. B. Griffin, ed.) Chicago, 1952
ESA	Eurasia Septentrionalis Antiqua
Germania	Germania (Römisch-Germanischen Kommission)
ICPPS	Proceedings of the International Congress of Prehistoric and Protohistoric Science
Inst. Arch. Ann. Rep.	Institute of Archaeology Annual Reports (University of London)
JBHM	Jahrbuch des Bernischen Historischen Museum
JMV	Jahresschrift für Mitteldeutsche Vorgeschicte
JRAI	Journal of the Royal Anthropological Institute
JSGU	Jahrbuch der Schweizerischen Gesellschaft für Urgeschicte
JVSTL	Jahresschrift für die Vorgeschicte der Sächsisch-Thüringischen Länder
JWH	Journal of World History (UNESCO)
L'Anthro.	L'Anthropologie
Man	Man (Royal Anthropological Institute)

Mannus	Mannus, Zeitschrift für Deutsche Vorgeschicte
MLUHM	Meddelanden från Lunds Universitets Historiska Museum
MZ	Mainzer Zeitschrift
Offa	Offa
PPS	Proceedings of the Prehistoric Society
PPSEA	Proceedings of the Prehistoric Society of East Anglia
PRIA	Proceedings of the Royal Irish Academy
PZ	Prähistorische Zeitschrift
Rev. Anthr.	Revue Anthropologique
Rev. Mens.	Revue Mensuelle de l'Ecole d'Anthropologie de Paris
Schlesien	Schlesiens Vorzeit in Bild und Schrift
Science	Science (American Association for the Advancement of Science)
Smithsonian	Annual Report of the Smithsonian Institution
Sov. Arkh.	Sovietskaya Arkheologiya
Ur-Schweiz	Ur-Schweiz, Mitteilungen zur Ur- und Frühgeschicte der Schweiz
Wiad. Arch.	Wiadomosci Archeologiczne
ZSAK	Zeitschrift für Schweizerische Archaeologie und Kunstgeschicte

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Fig. 21. RELATIVE CHRONOLOGY OF EUROPEAN NEOLITHIC CULTURES

CENTRAL EUROPE	BALTIC	FRANCE	SWITZERLAND	BRITAIN
BRONZE AGE	BRONZE AGE	BRONZE AGE	BRONZE AGE	BRONZE AGE
	CIRCUMPOLAR STONE AGE			
	LATE NEOLITHIC			
MÜNCHSHÖFEN				
BADEN				
ALTHEIM				
CORD-WARE		CORD-WARE	CORD-WARE	
BEAKERS				
GLOBULAR AMPHORAE				
AUNJETITZ	Upper Grave		HORGEN	SECONDARY NEOLITHIC CULTURES
WALT.-BERN.	Ground Grave			
SALZMÜNDE	Bottom Grave			
BAALBERG	BOAT-AXE BEAKERS	CHANNELLED WARE BEAKERS		BEAKERS
EAST & SOUTH FUNNEL BEAKER	PIT-WARE	LATE CHASSEY ER-LANNIC		
MICHELSBERG	IV PASSAGE GRAVE	FORT-HARROUARD	MICHELSBERG	
	III	SEINE-OISE-MARNE		
	II SINGLE GRAVE	MICHELSBERG		
	I			
JORDANSMÜHL	EARLY NEOLITHIC C		CORTAILLOD	
BRZESC KUJ.	EARLY NEOLITHIC B			
AICHBÜHL	EARLY NEOL. A			
HINKELSTEIN	ERTEBØLLE	CHASSEY	EGOLZWIL	WINDMILL HILL
RÖSSEN		IMPRESSED WARE		
STICHBANDKERAMIK		DANUBIAN	RÖSSEN	
LENGYEL				
MORAVIAN PAINTED WARE				
LATE DANUBIAN I	MESOLITHIC	MESOLITHIC	MESOLITHIC	MESOLITHIC
DANUBIAN I				
MESOLITHIC				